

CHINA.

IMPERIAL MARITIME CUSTOMS.

II.—SPECIAL SERIES: No. 2.

MEDICAL REPORTS,

FOR THE HALF-YEAR ENDED 31ST MARCH 1880

19th Issue.

PUBLISHED BY ORDER OF
The Inspector General of Customs.

SHANGHAI
STATISTICAL DEPARTMENT
OF THE
INSPECTORATE GENERAL

MDCCCLXXX.

INSPECTOR GENERAL'S Circular No 19 of 1870

INSPECTORATE GENERAL OF CUSTOMS,

PEKING, 31st December 1870

SIR

1—It has been suggested to me that it would be well to take advantage of the circumstances in which the Customs Establishment is placed, to procure information with regard to disease amongst foreigners and natives in China, and I have, in consequence, come to the resolution of publishing half-yearly in collected form all that may be obtainable. If carried out to the extent hoped for, the scheme may prove highly useful to the medical profession both in China and at home, and to the public generally. I therefore look with confidence to the co-operation of the Customs Medical Officer at your port, and rely on his assisting me in this matter by framing a half-yearly report containing the result of his observations at upon the local peculiarities of disease, and upon diseases rarely or never encountered out of China. The facts brought forward and the opinions expressed will be arranged and published either with or without the name of the physician responsible for them, just as he may desire.

2—The suggestions of the Customs Medical Officers at the various ports as to the points which it would be well to have especially elucidated, will be of great value in the framing of a form which will save trouble to those members of the Medical profession, whether connected with the Customs or not, who will join in carrying out the plan proposed. Meanwhile I would particularly invite attention to—

a—The general health of during the period reported on, the death rate amongst foreigners, and, as far as possible, a classification of the causes of death.

b—Diseases prevalent at

c—General type of disease, peculiarities and complications encountered, special treatment demanded.

d—Relation of disease to { Season
Alteration in local conditions—such as drainage, &c
Alteration in climatic conditions

e—Peculiar diseases, especially leprosy

f—Epidemics { Absence or presence
Causes
Course and treatment
Fatality

Other points, of a general or special kind, will naturally suggest themselves to medical men, what I have above called attention to will serve to fix the general scope of the undertaking. I have committed to Dr ALEX JAMIESON, of Shanghai, the charge of arranging the reports for publication, so that they may be made available in a convenient form.

3—Considering the number of places at which the Customs Inspectorate has established offices, the thousands of miles north and south and east and west over which these offices are scattered, the varieties of climate, and the peculiar conditions to which, under such different circumstances, life and health are subjected, I believe the Inspectorate, aided by its Medical Officers, can do good service in the general interest in the direction indicated, and, as already stated, I rely with confidence on the support and assistance of the Medical Officer at each port in the furtherance and perfecting of this scheme. You will hand a copy of this Circular to Di _____, and request him, in my name, to hand to you in future, for transmission to myself, half-yearly reports of the kind required, for the half-years ending 31st March and 30th September—that is, for the Winter and Summer seasons.

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I am, &c,

(signed)

ROBERT HART,

I G

THE COMMISSIONERS OF CUSTOMS,—*Newchwang, Ningpo,*
Tientsin, Foochow,
Chefoo, Tamsui,
Hankow, Taku,
Kuiliang, Amoy,
Chinkiang, Swatow, and
Shanghai, Canton

SHANGHAI, 1st September 1880

SIR,

IN accordance with the directions of your Despatch No 6 A (Returns Series) of the 24th June 1871, I now forward to the Statistical Department of the Inspectorate General of Customs, the following documents —

A — Report on the Health of Newchwang, pp 1-4,

B — Report on the Health of Tientsin, p 5,

C — Report on the Health of Chinkiang, pp 6-8,

D — Report on the Health of Kiukiang, pp 9-10, each of these referring to the year ended 31st March 1880

E — Report on the Health of Swatow, pp 11-15,

F — Report on the Health of Canton, p 16,

G — Report on the Health of Shanghai, pp 17-29,

H — Report on the Health of Amoy, p 30,

I — Report on the Health of Chefoo, pp 31-32, each of these referring to the half-year ended 31st March 1880

Notes on Spine, by Dr MANSON, of Amoy, pp 33-37

A Monograph on Beriberi, or the "Kaké" of Japan, contributed by Dr D B SIMMONS, of Yokohama, pp 38-76

I have the honour to be,

SIR,

Your obedient Servant,

R ALEX JAMIESON

THE INSPECTOR GENERAL OF CUSTOMS,

PEKING

The Contributors to this Volume are—

JAMES WATSON, M D, L R C S E

Newchwang

A IRWIN, L K & Q C P, L R C S I.

Tientsin

R G WHITE, L S A, M R C S

Chinkiang

J JARDINE, M D, C H M

Kiukiang

E I SCOTT, L K & Q C P, I R C S I

Swatow

F CARROW, M D

Canton

R A JAMIESON, M A, M D, M R C S

Shanghai

P MANSON, M D, C H M

Amoy

J G BRERETON, L K & Q C P, I R C S I

Chefoo

DUANE B SIMMONS, M D

Yokohama, Japan

A — Dr JAMES WATSON'S Report on the Health of Newchwang for the Year
ended 31st March 1880

THE climate of this district during the year under review may upon the whole be considered an average one. The first half of spring was extremely boisterous, but the latter half and the whole of summer were pleasantly free from gales and from those strong winds, little less than gales, which rendered animal and vegetable life in April, and some days in May, a hard fight. There was rather more than the usual amount of rain, which did little harm to anyone except those who lived in houses with floors insufficiently raised above the ground, while the farmers, with few exceptions, were greatly benefited by it. Generally, the crops were good, and the common people had enough to eat, and were free from serious disease.

The winter was decidedly mild, although one or two days were exceptionally cold. But as only a moderate amount of snow fell, and as there were but few days when strong winds occurred, our winter weather was very pleasant. It is often remarked by delicate residents how much better they bear the cold of this somewhat Arctic region than that of Shanghai and the River Ports.

Two of my lady patients have just passed their first winter in Newchwang, and while one of them is far from robust, the other has been for some time an invalid, yet so far as the climate has had any effect on their constitutions, it has been favourable.

The general health of the European and Chinese population during the year has been good. In my practice among the former, I have had several interesting and somewhat serious cases, which were little, if at all, affected by the peculiar climate of this place, but for obvious reasons I do not refer to them more particularly. The Chinese in the native town suffered slightly from small-pox, but a large trading mart, distant from this port some 30 miles up the river, has been visited by a severe epidemic of that disease, which has been sadly fatal. With, however, the exception of a moderate amount of small-pox and a somewhat larger number than usual of cases of febricula and typhus-like fever, our near native neighbours have enjoyed excellent health.

The following are brief notes of a few cases in this year's practice —

Premature Labour (at Six Months) — A B, æt 26, second pregnancy, during the whole time of pregnancy was in a feeble state of health, and absolutely incapable of taking exercise. The labour pains were irregular and weak, and as symptoms of exhaustion set in, I administered chloroform, turned the child, and so delivered it. The infant was asphyxiated when born, but although respiration was eventually fully established, it only lived a few hours. The mother made a good recovery.

Puerperal Convulsions — C D, æt 28, first labour, full time, delivered by forceps. Patient is of a weak constitution, but labour progressed satisfactorily until the os was fully dilated, and the head of the child was in the lower outlet of the pelvis. Soon after this the pains became weak and irregular, and about 2 P.M. she had a violent convulsion, and I was sent for. I found my patient tired and dazed, but labour had progressed considerably since my last visit to her some hours previously. About 3 o'clock, when I was sitting beside her, another fit occurred, and the neck, hands and legs were thrown into violent convulsion, and froth welled from the mouth. This was evidently an epileptic attack. Six convulsions took place before I gave chloroform and delivered the child by forceps, an operation which I considered necessary, as the mother seemed rapidly sinking. The child, which had a rather large head, weighed eight and a half

pounds, and was in every way vigorous when born. Immediately after the birth of the child the mother was extremely prostrated, but she made so good a recovery that at the end of three weeks she was able to move about the house. No convulsions took place after the birth of the child, and the mine, when examined soon after labour was completed, had only a trace of albumen in it. My patient assures me that neither she nor any member of her family has previously suffered from convulsions of any kind. During the fits her tongue was deeply cut on both sides, and it became greatly swollen, so that eating was a difficult matter, and distinct utterance an impossibility.

Concussion, with Compression of Brain—E F, æt 42, a member of the Out door Customs staff, was one day in January driving in a native cart, when the mules, taking flight, ran off with him. He somewhat thoughtlessly raised himself on the shafts and jumped from them while the vehicle was in rapid motion, and the back of his head came with great violence into contact with the hard, frost-bound road. He was picked up in a semi-conscious state and taken to his house, which fortunately was close at hand. I found him suffering from shock (concussion), but soon afterwards symptoms of compression set in as well. The pulse was slow, and for the space of two weeks its beat was seldom more than 36 per minute. It was also somewhat irregular. For about 14 days my patient lay in a state bordering on coma, from which he was occasionally aroused by acute pain in the head. There was very marked muscular weakness, but no paralysis. He complained of inability to sleep, and persistent headache for several weeks. About the fifteenth day after the accident the pulse began to improve, and it was interesting to note the regular manner in which its beat increased by about three every two days, until it reached 60 per minute, at which it stopped, until my patient was well enough to move about a little and take nutritious food.

I have never before seen a case in which symptoms of shock were so distinct, and those of compression so pronounced, without a certain amount of fever supervening. In the present case there was not a hint of fever throughout its course, and I think the fortunate termination of the accident is greatly due to the fact that from boyhood my patient had been practically a total abstainer. For a good many weeks after returning to duty he was feeble and easily tired, but he is now as strong and active as he used to be before his accident.

Pistol shot Wound of Hand, Amputation above Wrist—A Ningpo sailor, belonging to a Chinese gun-vessel, was handling carelessly a large pistol, when it suddenly went off, and discharged its contents into his hand, which was greatly lacerated. I was asked to see him in the native town, about two miles from my house. It was quite evident, even to the Chinese, that amputation was necessary, and, having brought the man to the foreign settlement, I amputated the hand a little above the wrist. When I first saw him there was a considerable oozing of blood from the hand, and to stop it I applied a bandage, which so effectually controlled the blood vessels that when I amputated, some three hours afterwards, and that well beyond the injured tissues, I could only find one artery (the radial) to ligature. I was afraid secondary hæmorrhage would set in, and I left a servant to look out for this accident, but the wound healed throughout by the first intention without any further loss of blood.

Hydrocele, Operation—During the winter a Chinaman from Moukden consulted me about a large swelling of the scrotum which he said had annoyed him, and for which he had been treated by several members of the native faculty for the last five years without any benefit.

On the right side was a large and solid tumour, and I found it difficult to make out fluctuation, the walls of the sac were thickened to such an extent that even in a darkened room it was not possible to transmit light from a candle through them. The left testicle was also enlarged. I tapped the hydrocele, and drew off rather more than 48 ounces of a straw coloured fluid, and then injected three drachms of tincture of iodine into the tunica vaginalis. After four weeks there was a considerable re-accumulation of fluid, which I again drew off, and re-injected the sac. In a few weeks after the second injection of iodine, the hydrocele was cured, the enlarged testicle reduced in size by one half, and my patient returned to Moukden.

Penetrating Wound of Abdomen, with Protrusion of the Gall bladder, Omentum, and Small Intestine—In the spring of 1879, one of the cargo boats in the river was being brought alongside of a steamer, to which

already several similar boats were lashed. The tide was at the time strong, and the sailors, failing to secure their boat to the steamer with their hooks, flung a small grappling anchor on board one of the boats already fastened to the steamer. Unfortunately, the anchor caught a lad of about 14 years of age, who was on deck at the time, in the lower third of the abdomen, on the right side, and dragged him into the river, which was running at the rate of six miles an hour. The boat was carried past the steamer a considerable distance before it was brought to anchor, and the wounded boy was in the meanwhile in the water. He was eventually picked up, and the next day I was asked to see him, some 14 hours after the accident. I found a triangular wound through the abdominal walls on the right side, which, with the opening into the peritoneum at the lower edge of the liver, was completely hidden from view by a tumour, consisting of the gall-bladder, about three feet of small intestine, and a portion of the omentum. These were lying dry and matted together by the side of the boy who, pale and exhausted, was stretched on his back on a native buck bed. After sponging the viscera with warm water, I managed, with little difficulty, to get this formidable-looking mass returned into the abdominal cavity.

As the two sides of the triangular wound in the walls of the abdomen together measured about 10 inches, and that in the peritoneum was large enough to permit the ends of three fingers to enter it, I considered it prudent to stitch up the latter with a couple of sutures. The external wound was also closed with several sutures, and a pad and bandage applied over it. The pulse was, after the reduction of the tumour, 120, and very weak. I prescribed opium, and the boy was allowed rice water in small quantities. For eight days the pulse became gradually slower, and the case progressed satisfactorily. I was beginning to believe that the boy would pull through, when, against my instructions, someone who visited the lad gave him, in response to his earnest request for solid food, a number of heavy indigestible cakes. These he ate, and they speedily brought on a violent fit of retching, and he vomited a large round worm. This effort burst the stitches, and the wound, which up to this time looked promising, took on an unhealthy action. Symptoms of peritonitis set in, and he died 12 days after the accident. I believe that if I could have kept the boy entirely under my own control, and prevented him eating those indigestible cakes, he had a very fair prospect of recovery. In spite of the unsatisfactory result, the case is interesting. To sustain such a terrible injury as I have described, to be afterwards dragged with violence into a rushing river (with the temperature about freezing point), and to remain in it some four or five minutes, to be brought on shore, and lie for 12 hours with such a tumour exposed to the action of the air before it was reduced, and, in spite of unsatisfactory nursing, to live for 11 days afterwards, is an illustration of vitality which we do not frequently meet with in practice.

In former Reports I have frequently had occasion to remark on the unsatisfactory health of the little colony of Roman Catholic sisters (10 in number), who for several years past have laboured at this port. During the past twelve months there has not been a single case of serious illness among them. Several of the sisters have been on the sick list, but all the cases have been of a chronic character, and were referable to constitutional weakness, or overwork. This somewhat marked immunity from serious ailments in the members of the Catholic Mission is in a measure explained by the improved sanitary condition of their compound, and the increased vigilance exercised by the lady superior in detecting the first approaches of disease, and at once relieving from full duty any sister who shows symptoms of failing health or strength. It is also an indirect proof of the fair health of the native population during the year, as when in the past serious sickness abounded amongst the Chinese, their faithful friends the sisters have invariably suffered too.

During the past year there were four births and one death (that of the prematurely-born child referred to above) among the foreign residents.

Mr DEIGHTON-BRAYSHER, Harbour Master, has kindly assisted me in drawing up the Meteorological Table which I append to this Report

METEOROLOGICAL TABLE for the Year ended 31st March 1880

YEAR AND MONTH	Highest Reading of Barometer (Aneroïd) for the Month	Lowest Reading of Barometer (Aneroïd) for the Month	No of Days Temperature fell below Zero	No of Days Temperature fell below 10°	No of Days Temperature fell below 20°	No of Days Temperature fell below 32°	No of Days Temperature fell below 42°	No of Days Temperature was above 65°	No of Days Temperature was above 70°	No of Days Temperature was above 75°	No of Days Temperature was above 80°	No of Days Temperature was above 85°	No of Days Rain fell for upwards of 2 Hours in the 24	No of Days Snow fell for upwards of 2 Hours in the 24	No of Days no Rain or Snow fell	No of Days Thunderstorms occurred	No of Local Duststorms	No of Days High Winds prevailed for a longer period than 2 Hours in the 24
1879																		
April	30 56	29 61				12	20	1					5	2	20		2	8
May	30 16	29 54					2	17	4	1			8		22	3		1
June	30 22	29 56						29	28	26	9	3	6		23	1		
July	30 08	29 49						31	31	29	23	6	7		23	3		1
August	30 16	29 50						31	31	29	23		6		24	2		1
September	30 24	29 75						28	27	12	1		3		26	1		2
October	30 70	29 90				1	16	2					4		24			2
November	30 75	29 76				23	30						2	1	25			1
December	30 70	29 73	11	24	31	31							2	3	26			4
1880																		
January	30 97	30 04	4	29	31	31	31							2	28			1
February	30 89	30 14	3	15	29	29	29							2	27			
March	30 74	29 68			5	21	31						2	2	27			3

REMARKS—The barometer showed a higher reading than in previous years, nor was the depression as low as might have been expected

For the twelve months ending 31st March 1880, the temperature generally was lower than that usually experienced. The highest register was 90°, on the 8th August. In April the minimum reading (on the 7th) was 22° F. Snow fell on the 19th, and frost continued up to the 23rd. In the month of February (1880), the mercury fell much lower than has been known for many years. One instrument marked -19°, but beyond a certain range our thermometers are, I fear, not to be depended upon.

There was an unusual amount of moisture in December. Rain fell on the 13th, with the thermometer at 42°, and again on the 27th. This was an unprecedented occurrence.

With the exception of the month of April, there were fewer gales than usual, two only being worthy of note. The blow on the 31st July and 1st August clearly proved that typhoons on this coast extend further north than is generally supposed, and though the centre of this storm passed a long way to the southward and eastward of this district, yet we were sensibly affected by it. The hardest gale occurred in December, when its force was 8, from 8 P.M. of the 7th to 4 P.M. of the following day, the wind veering from N to N.E., accompanied by snow. The thermometer fell to 2°, and the river was frozen hard from bank to bank. The severity of the weather during these two days was extreme. Numbers of the poor succumbed to its bitter influence. Even the hardy magpie fell dead in the streets, while 50 miles to the north of this settlement many pheasants and partridges were picked up which had been killed by the frost.

The barometrical readings were taken from an instrument placed about 8 feet above high water level. The thermometer was hung under a verandah in a shaded situation, facing the north.

B—D₁ A IRWIN'S Report on the Health of Tientsin for the Year ended
31st March 1880

For the past twelve months the health of foreigners at this port was remarkably good. The autumn months contributed most to the sick list, but with no cases of special severity. Diarrhoea, dysenteric attacks, and intermittents were the forms of disease prevalent during that time. We have experienced a very mild winter, and commenced spring well, no duststorms of any duration, and with clear, open weather, very different indeed from the spring and winter of 1879. The surrounding country continues flooded. We have to thank the Tientsin Municipal Council for many improvements in the settlement and its neighbourhood, notably for the improved condition of the roads and the drainage system of the concession, and also for a raised road through the plain at the back of the settlement, which has been thickly planted with trees. The road, constructed on the old fortifications, extending for two miles and a half along the canal, has proved a great boon. The numbers who daily use the roads show how thoroughly they are appreciated, and when the roads are completed and the intervening spaces planted with trees, as I suggested last year, the community will derive great benefit from them. The trees and raised road will completely shut the settlement off from the foul plain which lies between it and Tientsin city.

The Foreigners admitted to the hospital during the twelve months were 33, as follows —

Frostbite	4 cases	Fracture	4 cases
Dysenteric diarrhoea	6 „	Anæmia	1 „
Dysentery	2 „	Intermittent fever	3 „
Eye disease	3 „	Various	10 „

These were all non-residents.

Whooping-cough was very prevalent among the Chinese during September, October and November, and six European children contracted the disease. It was of a very mild character, and in no case were there any alarming symptoms. Entozoa, of different varieties, are very frequently met with, the natives suffered most from lumbrici, and several foreigners from tænia. The only form of tænia I have met with here is the *mediocanellata*. There were eight births during the year—five girls, three boys.

There was one death from phthisis. The disease was not contracted in China.

C—D¹ R G WHITE'S Report on the Health of Chinkiang for the Year
ended 31st March 1880

THE health of the community has been on the whole good, especially when we remember the protracted heat of the summer, which proved most trying to some old residents in the port. The following table has been supplied to me through the kindness of the Harbour Master Mr GUNTHER. The heat was more distressing from its duration than from its intensity at any one time.

METEOROLOGICAL TABLE

YEAR AND MONTH	THERMOMETER				No of Days Rain and Snow		Depth of Rainfall.	TIDES	
	Day		Night					Highest Water	Lowest Water
	Max.	Min	Max	Min	Rain	Snow			
1879	°	°	°	°			<i>Inches</i>	<i>Ft in</i>	<i>Ft in</i>
April	74	42	70	42	6		3 52	8 4	1 2
May	84	61	80	60	13		9 30	10 10	1 3
June	90	60	86	62	7		2 94	13 1	8 4
July	93	79	93	78	5		3 79	14 5	10 7
August	92	77	90	75	9		3 83	14 6	9 3
September	87	68	83	68	9		6 67	12 4	7 9
October	74	50	73	50	6		2 96	11 6	5 11
November	62	43	64	42	4		1 87	10 4	2 6
December	58	29	53	27	1		0 05	7 6	
1880									
January	44	25	44	29	4	7	1 87	5 5	
February	44	33	45	30	10	2	2 38	8 10	0 1
March	63	35	67	34	5		1 78	8 2	2 2

I should mention that the thermometer from which the above is registered is placed in a specially cool position. The thermometer in our dwellings reached 97° and 98° on several days during the months of July and August.

During the year there have been no deaths among the foreign community. Three births occurred—two boys and one girl. The confinements were all natural and uncomplicated, though in one case, on a former occasion, instruments and chloroform had been requisite. Intermittent fever was observed at the close of summer and during the autumn, among the natives it was prevalent to an unusual degree.

One case of typhoid fever occurred, the patient was a resident from Wuhu, but had been there only a short time. The case was a typical one, the head symptoms were most marked, while successive crops of rash, the evacuations from the bowels, and the thermometer indications, left no doubt as to the nature of the case. I am under the impression that there has been doubt as to cases of enteric fever occurring in the valley of the Yangtze. In addition to the above-mentioned case, I had also a Chinese patient with similar well-marked symptoms. It was interesting to note the effect of wine on the first-named patient. Although so useful in some cases, when on the twenty-fifth day some wine was administered, immediately an increased temperature to 102° was the result. Three days after, when wine was again exhibited, a similar result occurred. The patient recovered completely.

Practice among the Chinese of any special interest has been chiefly of a surgical nature, and in many cases ordinary intelligence at the early stage of the disease would have prevented any serious lesion. Thus, some 12 patients presented themselves for treatment with necrosis of the inferior maxilla, the bone having necrosed in consequence of neglected or badly managed alveolar abscess, though the neglected cases were by no means so severe as those in which there had been an unlimited amount of plaster used.

A mandarin from Hunan presented himself, and gave a history of a carious tooth, which inflamed and resulted in necrosis of the left half of the lower jaw, he had been treated by many native surgeons, but not with any good result. The patient was much reduced, there was a profuse discharge from a sinus, which was so large that half the food escaped from the mouth during mastication. The necrosed bone was removed under chloroform, and a speedy recovery resulted. As regards general health, there was, however, considerable difficulty experienced in effecting complete closure of the sinus, at its lowest part it was immediately under the submaxillary gland, and the constant flow of saliva kept it open. The wound was, however, reduced from 4½ inches wide to ¾ in., and but for the impatience and opium smoking of the patient, no doubt the cure would have been complete in a few more days, but being so much improved from his former condition, he was satisfied sooner than his medical attendant.

Several cases of malignant disease have come for treatment, and the development attained is rarely seen at home, when surgical treatment would have interfered with the disease.

A man from north of the river came to the dispensary and presented his right side for examination, with a cancerous mass, involving the mammary gland, and extending from his clavicle down some 12 inches x 10 inches at base. The mass was firmly adherent to the ribs, the axillary glands stood out, four being as large as walnuts, and two as large as mandarin oranges. The tumour, according to the patient's account, had existed two years, it had grown slowly at first, was painless, and there was no impairment of general health for the first year. During the second year there was rapid growth, and general health suffered by loss of flesh. Three months before coming, ulceration had set in, attended with profuse discharge and great prostration. The final result was no doubt rapid, but patient hearing that no operation could be performed, returned home and did not present himself again.

Four cases of epithelioma of the lip were operated on, three of the number were in females, and one of these was of the upper lip. Four other cases were seen, but operation was declined, and of these three were females. These cases, it will be observed, form exceptions to the general rule.

Inguinal hernia, direct or indirect, seems to be most common among the Chinese in this locality, and in the majority of cases there does not seem to be any desire to remedy the abnormality, in fact, little inconvenience seems to be experienced, unless the hernia assumes a

very large size, and then only on this account relief is sought. I have not seen or heard of a case of strangulation, and, in fact, only very few cases present themselves which are not easily reduced. Many fatal cases of childbirth have been reported, from ignorance in the management on the part of the midwives. According to accounts from native sources, labours have extended over four days (and even six days have been mentioned), the delay being caused by cross-birth, and the result, of course, fatal.

On being summoned to a case last February, the patient was found to have been in labour 48 hours, all was supposed to have been going on well, until the liquor amni came away the day previous to my visit, and then the arm of the child was found presenting. After traction on the arm had been tried for some time without any good result, another midwife was summoned, and then another. These all requested that some one of higher reputation should be summoned, and accordingly a fourth woman was called, and she, with more temerity than her predecessors, cut off the presenting arm, and soon after, with them, left the house. Examination revealed a mass which consisted of the mutilated shoulder and ribs of the child in a state of advanced decomposition, the mass was fixed and firmly held by the uterus, which now contracted but feebly at each pain, the parts of the mother were almost in a sloughing condition, her pulse was fairly good. To allay her pain during the necessary manipulation, and her alarm at the presence of a male foreigner, chloroform was administered, and then a large quantity of urine was drawn off. It was impossible, without dangerous exertion, to turn the mass occupying the outlet of the pelvis, so excision was effected, and then decapitation, after which a dose of ergot was administered, and with a little traction by means of the blunt hook, the body was born, which was soon followed by the head. The friends of the woman wished her treated according to native custom after delivery, so the result as to the soft parts could not be accurately ascertained, there was no doubt considerable sloughing, but no fistulae have been reported, as would have been had they occurred.

*D — Dr J JARDINE's Report on the Health of Kiukiang for the Year
ended 31st March 1880*

DURING the period now reported on the health of this community has been very good. The only cases which caused great anxiety were one of typhoid fever of a grave character, which ultimately made an excellent recovery under treatment detailed in a previous Report, and one which unfortunately succumbed to serious or sero-sanguineous effusion into the brain, chest and other parts of the body, the result of an attack of scorbutus.

The latter patient had been suffering for over two months from swollen and bleeding gums before he came under observation, and he stated that he had been living almost exclusively on tea and toast, and carefully abstaining from a flesh meat and vegetable diet. He looked out of health, his countenance pale, sallow and earthy, and he complained that his gums bled on the slightest provocation. On examination, the gums were found swollen, soft and discoloured, and bled on the slightest touch, and several livid spots were observed on the palate. This led to the discovery of ecchymoses as large as the palm of the hand on the right arm and left leg, and smaller extravasations on various parts of the body. He complained of stiffness of his legs, and breathlessness on walking upstairs. There was no epistaxis, hæmatemesis, hæmaturia or albuminuria. His appetite was bad, the bowels constipated, and he suffered from hæmorrhoids. He was depressed, listless and indisposed to exertion. He had been recently married, and had left his wife in England, about whom he was constantly fretting. This continuous yearning and solicitude after the object of his affections preyed on his health and spirits, and caused him to neglect himself.

He was ordered an antiscorbutic diet of a generous character, lime-juice, milk, and tincture of perchloride of iron and quinine, but it is certain that he still continued to neglect himself. After three weeks treatment, the swelling and bleeding from his gums were much less, and most of the livid spots had disappeared from his body, but the depression and debility were still greater, and dyspnoea on exertion had increased. At this time he complained of dimness of sight, specially at night, inability to sleep, and there was a diffuse puffiness round his left orbit. Headache and vomiting supervened, drowsiness and coma set in, and he died.

Scorbutus, though usually a favourable and tractable disease before any of the internal organs have become seriously involved, is undoubtedly serious enough if in addition the patient's constitution is debilitated from lengthened residence (17 years) in the East, if his digestive functions are so impaired that mal-assimilation takes place, if he is depressed and brooding over other troubles, and getting advanced in years. This combination of unfavourable circumstances presented themselves in this case, caused him to disregard himself, and materially contributed to precipitate the fatal issue.

Two cases of congestion of the liver, treated by large doses of muriate of ammonia, and counter-irritation, recovered perfectly.

A case of subacute dysentery, treated by rectal injections and ipecacuanha and opium, made a very speedy recovery. This patient, who had suffered from previous attacks, attributed his more speedy recovery on this occasion to the action of the local treatment. This method of treating dysentery by rectal injections is favourably noticed in *The Practitioner* for December 1879, pp 448, 449.

Two priests belonging to the Catholic Mission, who had been resident for some years in the south of this province, arrived here last autumn, one suffering from chronic dysentery, the other from extreme emaciation, debility, and almost imbecility, as far as the condition of his mental faculties were concerned, consequent on several attacks of fever of the remittent type. Both made excellent recoveries, we can scarcely, however, consider them residents at this port, as they came here solely for the purpose of procuring medical assistance. The above forms the summary of important cases in a year's work among foreigners.

Among natives, an interesting case of accidental pistol-shot wound in the abdomen came under observation, and ended in complete recovery.

The patient, a woman, aged 28, was playing with a loaded pistol (it being unknown to her that the weapon was loaded), when she accidentally discharged the contents of one chamber into her abdomen, at a point in the umbilical region two inches to the left of the umbilicus and an inch and a half above it. The bullet passed through the abdomen and emerged at a point above the position of the left kidney. A dressing of carbolic oil was applied to both apertures, a binder firmly wound round her abdomen, full doses of opium administered every four or five hours, and the diet limited to a little tea and congee. She suffered from a considerable amount of shock for a few hours, when severe pain commenced in the abdomen, and continued for a week, when she began to show signs of improvement. The posterior orifice had closed at the end of a fortnight, and the anterior one by the eighteenth day, and in three weeks she had regained her usual health and appearance. Whether the bowel was wounded or not must remain a mystery, but as the pistol must have been in close proximity to her body when it was discharged, some charged powder and the wad must have penetrated into the abdominal cavity, so that it was marvellous that fatal peritonitis was not lit up. The bullet was afterwards found among her clothes, but no trace of the wad could be discovered. The pistol was an ordinary five chambered revolver.

On reference to statistics relating to penetrating wounds of the abdomen in the British army during the Crimean war, it will be found that out of 124 cases, 115, or 92.7 per cent, died, and in the French army, out of 121 cases, 111, or 91.7 per cent, died.

E—D₁ E I SCOTT'S Report on the Health of Swatow for the Half-year
ended 31st March 1880

I AM indebted to the courtesy of Mr Harbour Master RAE for the appended table of meteorological observations for the past six months —

ABSTRACT from METEOROLOGICAL TABLE

YEAR AND MONTH	WINDS					MERCURIAL BAROMETER				THERMOMETER						RAIN AND FOG			TIDES	
	Number of Days N to E	Number of Days E to S	Number of Days S to W	Number of Days W to N	Number of Days Calm	Highest by Day	Lowest by Day	Highest by Night	Lowest by Night	Highest by Day	Lowest by Day	Highest by Night	Lowest by Night	Average Wet Bulb	Average Dry Bulb	Number of Days Run	Number of Inches Rainfall	Number of Days Fog	Average Rise, Spring Tides	Average Rise, Neap Tides
1879	D h	D h	D h	D h	D h	Inch	Inch	Inch	Inch	°	°	°	°	°	°	D h	Inch	D h	Ft in	Ft in
October	20 20	5 4	0 4	2 16	2 4	30 25	29 92	30 25	29 98	89	73	80	68	75	79	0 20	2 21		7 9	5 6
November	13 16	5 20	0 16	6 16	3 4	30 29	29 98	30 27	29 85	86	60	71	51	65	68	3 0	4 16		6 9	4 6
December	17 4	7 12	1 0	2 20	2 12	30 42	30 05	30 38	30 07	90	53	76	50	59	65				7 6	5 6
1880																				
January	20 12	6 0		2 12	2 0	30 40	30 09	30 43	30 12	68	45	60	40	56	60	3 13	2 02		7 9	5 6
February	21 8	4 12	0 4	1 20	1 4	30 40	30 12	30 39	30 05	66	49	60	48	59	61	2 3	1 90		6 0	4 0
March	8 12	17 20	0 12	1 16	2 12	30 40	30 00	30 38	30 02	85	52	69	51	58	67	0 4	0 05	0 19	5 9	5 3

Note—Tides very irregular, not to be depended on, being greatly influenced by the winds

The thermometric records show what a very mild winter we experience here, and the observations relating to rain and fog show how very dry our winter climate is, there being only 9 days 16 hours and 31 minutes rain during the six months, the rainfall being 10 34 inches for that period. I have little to say concerning the health of the port, which has been uncommonly good, as I have had hardly any serious cases among the residents on afloat. It was an ordinary thing to have a clean bill of health for the whole port, with no one at all on the sick list. Too much cannot be said of the healthiness of Swatow during the winter months. Under these circumstances, I was hoping to have no death to record, but two men got fighting, and one stabbed the other in the back with a sheath knife, and the man died next day from hæmorrhage into the cavity of the thorax. This unfortunate accident, of course, does not reflect unfavourably on the health of Swatow, but necessarily adds one more to the list of those dying here. The case is of some interest, as the man was fatally wounded in the 'tween decks of the ship, and was able to walk to the doctor's cabin on the upper deck and call the doctor before he became faint from the injury, and fell down.

He showed no signs of a lung wound at the time, as there was neither bloody sputum, frothing at the wound, or emphysema of the skin. From the time of the injury till he died, 25 hours afterwards, he had no serious symptoms, and had a full, steady pulse throughout, and not much dyspnoea. Shortly before he died he asked for food, and ate some arrowroot, but, while in the act of eating, suddenly collapsed and died. I did not see him during his lifetime, and had the above account from the ship's surgeon. The postmortem examination showed a penetrating wound on the right side of the back, about 2 inches from the spine, passing downwards and forwards from about the sixth or seventh rib to the upper margin of the tenth rib, which was splintered. On opening the thorax, the right side was found full of blood, fluid and clotted, the lung collapsed and tight to the spine, and the external wound entering the chest at the upper margin of the tenth rib. A wound was also found in the lower lobe of the lung, cutting it almost in two.

It is strange that such a severe injury should have given rise to so few symptoms before death actually occurred. A case of hæmorrhage from a tooth may be of sufficient interest to report here.

B. D., a strong, healthy man of 35 years, came to me one day complaining of a lump under his jaw, and great pain and fever. On examination I found there was a swelling of the glands at the angle of the jaw, with considerable pain and puffiness, so I concluded there was matter not far off. On asking him to open his mouth, I found he could hardly do so, and, with difficulty, I was able to see enough to tell me that he was cutting one of his wisdom teeth. This accounted in a great measure for most of his trouble, and I incised the gum freely over the tooth, and left him with poultices over the inflamed glands. Next day he was easier, and there was free discharge of some rather fetid matter, and so he progressed favourably, and was getting all right, when bleeding began from around the tooth. At first in small quantities, and he thought little of it, but from day to day the amount increased, and, after a week, he again came to me, as he himself said, "bleeding like a pig." When I saw him there was no blood coming, and I was inclined to look on his account as an exaggeration, and gave him a styptic lotion to wash with, and requested to see him should the bleeding return. For three days he continued pretty free from his trouble, and thought he was all right, but on the same night he awoke with his mouth full of blood, and he continued to bleed for six hours, when he came to me quite faint and frightened. On looking into his mouth I could see the blood oozing steadily from the gum inside and next to the last tooth—the new one, as he cleaned the mouth with water, the blood could be seen welling up around the tooth and overflowing into the mouth. Pressure round the tooth seemed to have no effect in stopping the flow, which was bright red blood. I proposed to take out the tooth and look for the bleeding vessel, but this he objected to before trying other remedies. I accordingly applied the solid perchloride of iron around the tooth, *inside* the gum, with a very finely cut pencil of soft wood, and gave him ergot and iron internally. This had the desired effect for 12 hours, when the bleeding recommenced. Another application of the perchloride of iron, however, effectually stopped it this time, and it did not return again.

That the eruption of the wisdom teeth is often painful and difficult is well known, and all the symptoms this man suffered from are mentioned by SALTER, in *Holmes' System of Surgery*, with the exception of the hæmorrhage. Hæmorrhage after extraction of teeth is a complication occasionally met with, but I cannot find any mention of this complication of tooth eruption. I could find no reason for this bleeding, as the man had no hæmorrhagic diathesis, and had never bled before in his life from anywhere, and was a strong powerful man, with active out-of-door occupation. Such a case might have serious consequences, and in this one the bleeding was quite sufficient to be alarming.

Following the example of Dr JAMIESON of Shanghai, and Dr SOMERVILLE of Foochow, I will here add a contribution from obstetric practice among foreigners in China. I have before

me notes of 80 consecutive cases of labour in my practice in South China, 78 of which occurred at full time, and 2 at seven months They consist of—

First labour	27 cases	Sixth labour	3 cases
Second „	19 „	Seventh „	3 „
Third „	11 „	Eighth „	2 „
Fourth „	9 „	Ninth „	1 „
Fifth „	5 „		

Of the 27 first labours, all were single births, of which 26 were at full time, and one at seven months There were 22 natural labours, one had an adherent placenta, which I was obliged to scrape away from the uterine walls, one had retained placenta, from irregular muscular contraction, there was one tedious labour, in which the child was mutilated by a Chinese nurse before I was called, the nurse cutting open the child's scalp with a scissors, under the impression she was opening the membranes to allow escape of waters, two laborious labours, in which I was obliged to apply forceps (both these occurred in strong muscular women, not very young for primiparæ), symptoms of exhaustion setting in in both cases Of these 27 cases, all the mothers lived and made good recoveries

Of the 27 children born, 10 were girls and 17 boys, and of these all but three lived, one, mentioned above as having been mutilated before birth by a Chinese nurse, which only lived two days, one, which only survived its birth half an hour, in spite of continued artificial respiration and warm bath

I may mention that chloroform was administered for two hours during the second stage of this labour, which was in a woman of about 35 years, and I think the child's life might have been saved had the forceps been applied when I commenced to give chloroform, and the labour finished sooner My reasons for not applying the forceps were the absence of the lady's husband, the urgent request of her friends not to do so, and the fact that the head was slowly advancing, though very slowly

One child was born at seven months, and was only made to breathe after artificial respiration and baths were kept up for 90 minutes, and only survived four hours In this case also chloroform was given throughout the second stage, which lasted about two hours As far as I can trace the remaining 24 children, they are all alive, with two exceptions, viz, one boy, who died of acute hydrocephalus at two years old, and one girl, who died of acute dysentery (?) at sea, aged 15 months

Of the 19 second labours, all were single births, 18 were natural, and in one the placenta was retained, and had to be taken away In one case, chloroform was given for about 10 minutes towards the end of the second stage The 19 mothers all did well, and the 19 children (8 girls and 11 boys) are, as far as I know, all alive, with two exceptions—one boy, who died of acute inflammation of the brain at two years, and another boy, who died of convulsions at eight months

Of the 11 third labours, all were single births, all were natural Of the mothers, all are alive save one, who died of phthisis a year after her confinement, and of the 11 children (four girls and seven boys), all are alive except one, who died of chronic dysentery at three and a half years

Of the nine fourth labours, all were single births and natural labours at full time, with one exception, one labour being at seven months Of the mothers, all did well, though one was an

epileptic, and had some severe attacks during labour, and another was very much reduced and anæmic, on account of constant uterine hæmorrhage during pregnancy. Of the children born (two girls and seven boys), one girl was still-born at seven months, one boy died at 4 months old from bronchitis, one girl from acute hydrocephalus at 10 months, and, as far as I know, the others are all alive.

Of the five fifth labours, all were single births, and four natural labours. Of the mothers, all are alive save one, who died some months after her confinement, of acute abscess of the liver. Of the children born (three girls and two boys), all are alive. One of these cases had a retained placenta, which had to be taken away.

Of the three sixth labours, all were single births and natural labours, two girls and one boy born, mothers and children all alive.

Of the three seventh labours, all single births and natural labours, three girls born, mothers and children all alive.

Of the two eighth labours, both single births and natural labours, one boy and one girl born, the mothers did well, the girl died at 15 months of spasm of the glottis.

Of the one ninth labour, natural, a girl, both mother and child are alive and well.

Considering these 80 cases together, it is rather remarkable to have met with 80 consecutive cases of single births and head presentations. They show the birth of 33 girls and 47 boys, with only two deaths to children at full time, and two to children born at seven months, they also show the use of the forceps only twice in 80 cases, and of chloroform only six times. I might here remark that I never use chloroform unless specially requested to do so, or I see some special reason for its use, as I am inclined to the belief that it conduces to inertia of the uterus. Of the six cases in which I administered chloroform, three of the children born died, one at full time, the other two at seven months. Concerning inertia of the uterus, I cannot say that I have found any particular tendency thereto here more than elsewhere, there being fair average uterine action in most, if not all, of my cases. I have had no case of postpartum hæmorrhage, though I have attributed this fact to the practice I have of always giving a full dose of ergot just as the head of the child is passing over the perinæum, and using ergot freely should there be any threatening of bleeding afterwards. I have considered myself very fortunate to have so far escaped this unpleasant complication, so common in tropical climates, especially in India, and have always given the hæmostatic properties of ergot the credit of it. To the use of ergot, perhaps, may be attributed the relatively rather frequent retention of the placenta (four in 80 cases) which I have met with, as I am careful to maintain steady pressure over the fundus with my hand till the placenta is expelled. I think ladies living in the south of China may congratulate themselves on the easy process parturition is there, if these 80 cases at all represent the practice of other obstetricians in this part of the world.

Added to these 80 cases, I would mention five miscarriages before three months, and three cases of mole pregnancies.

Of the 78 mothers delivered at full time, 41 nursed their babies the usual nine months, and some of them longer, solely against my will. I am here speaking somewhat outside of my knowledge, as many of these 41 mothers passed from my care and observation, as they lived on board ships, but they were nursing and able to nurse when last seen. One had plenty of milk,

but preferred to bottle-feed from the commencement, 11 partly nursed and partly bottle-fed their children from the first, two nursed for some weeks and were obliged to leave off, one because there was no milk, and the other on account of breast abscesses. The remaining 23 were unable to nurse at all. My observation leads me to the belief that many of the foreign women *residing* in the south of China are unable to nurse, either on account of insufficient quantity of milk, or of insufficient nourishment in the milk, and this suggests the important question, what is the best way to bring up children when the natural supply of nourishment fails? I cannot go into the subject of artificial feeding here, but would say in passing that some of the finest children I have seen anywhere have been bottle-fed and reared on condensed milk for the first few months, and after on stronger food, varying as each individual child showed a requirement for it. With ordinary care, and more than ordinary cleanliness, I think there is nothing to fear from bottle-feeding, and it is to my mind far preferable to the alternative of employing a native wet-nurse, which is quite as artificial a mode of feeding, and not nearly so cleanly, and far more troublesome and dangerous.*

* Observation in Shanghai does not support the opinion which Dr. SCOTT has derived from his favourable experience in the South

F—D₁ F CARROW's Report on the Health of Canton for the Half-year
ended 31st March 1880

THE health of the port has been very good during the last six months, only the ordinary diseases incident to the climate of South China being presented for treatment. I have, however, had to deal with several cases of ulcerated throat, which in the spring was epidemic here. It was attended with but slight fever, and yielded readily to a gargle of nitrate of silver.

I have had occasion to treat five cases of measles in the half-year just passed, three adults and two children.

Gastric and gastro-enteric fever in children, but not dependent upon the presence of worms in the intestine, has come under treatment. The exacerbations occurred at noon of each day, with but little diminution in the strength of the fever during the rest of the day and evening. There was no very decided remission, but it resembled a continued fever. The symptoms presented were—tenderness over the abdomen, constipation, flatulence, high fever, pulse 140, temperature $103^{\circ}8$ (daily maximum), and a peculiar scarlet colour at the tip of the tongue and around its edges, while its middle was thickly covered with a yellowish mucus, through which the scarlet papillæ protruded. Slight delirium was noticed, and the disease exhibited a very decided tendency to become chronic. It yielded to quinine and bark, acid drinks, etc, but was very obstinate.

I have to report five births, no deaths.

I am indebted to the Assistant Tidesurveyor for the accompanying meteorological table.

METEOROLOGICAL TABLE

ABSTRACT from the Meteorological Table for the months of January, February and March 1880, showing Winds, how many Days different directions, with the average hourly Force, Maximum and Minimum of Barometer and Thermometer, also the average Rise and Fall by day and by night, Rainfall during each month, the highest rise of Tide above low-water level, also the average Rise from previous ebb, by day and night.

MONTH	WINDS							WEATHER			BAROMETER				THERMOMETER				TIDES			
	N to E		E to S		S to W		W to N		Average Hourly Force	No of Days Fog	No of Days Rain	Rainfall in Inches	DAY		NIGHT		DAY		NIGHT		The Highest Tide and the Average Highest	The Lowest Tide and the Average Lowest
	No of Days	N to E	No of Days	E to S	No of Days	S to W	No of Days	W to N					The Highest Reading and the Average Highest	The Lowest Reading and the Average Lowest	The Highest Reading and the Average Highest	The Lowest Reading and the Average Lowest	The Highest Reading and the Average Highest	The Lowest Reading and the Average Lowest	The Highest Reading and the Average Highest	The Lowest Reading and the Average Lowest		
miles												Inches	Inches	Inches	Inches	F	F	F	F	Ft in	Ft in	
January	14	2			15				6.6	4	11	1.0	30.20 30.38	30.15 29.99	30.19 30.37	30.17 29.98	61° 73°	53° 42°	57° 64°	53° 40°	3 10 5 6	5 0 6 6
February	21		1	5	2				4.8	15	21	8.1	30.13 30.30	30.08 29.96	30.13 30.30	30.11 29.91	55° 68°	55° 46°	57° 68°	54° 47°	4 1 5 6	4 7 5 9
March	14	10	1	2	4				3.5	2	4		30.17 30.31	30.06 29.91	30.12 30.28	30.09 29.94	73° 83°	62° 53°	69° 76°	63° 50°	4 8 6 2	4 6 6 5

REMARKS.—Rain fell on 9 days measuring 1 inch, during January 1879. Rain fell on 5 days, measuring 1.6 inches during February 1879. Rain fell on 13 days, measuring 6.7 inches during March 1879.

G—D1 ALEXANDER JAMILSON'S Report on the Health of Shanghai for the
Half-year ended 31st March 1880

ABSTRACT of METEOROLOGICAL OBSERVATIONS taken at the Observatory of the Jesuit Mission at
Sicawei, for the six months ended 31st March 1880 Latitude, $31^{\circ} 12' 30''$ N Longitude
E of Greenwich, $8^{\text{h}} 5^{\text{m}} 44.63^{\text{s}}$

DATE	Barometer at 0° C	THERMOMETER		Elastic force of Vapour	Humidity	Ozone	Velocity of Wind observed hourly	Mean Direction of Wind	Total Evapora- tion during Month	Total Rainfall during Month	REMARKS
		Diatnal Mean Temperature in Shade	Extreme Temperature in Shade								
1879	mm	$^{\circ}$ C	$^{\circ}$ C	mm of Mercury	0 100	0 21	Kilom- per Hour		mm	mm	
October	<div> <div>Max</div> <div>Mean</div> <div>Min</div> <div>Range</div> </div>	<div> <div>770.59</div> <div>766.05</div> <div>756.00</div> <div>14.59</div> </div>	<div> <div>17.20</div> <div>—</div> <div>5.00</div> <div>21.50</div> </div>	<div> <div>19.80</div> <div>11.62</div> <div>3.60</div> <div>16.20</div> </div>	<div> <div>100.0</div> <div>78.9</div> <div>27.0</div> <div>73.0</div> </div>	<div> <div>16.0</div> <div>8.9</div> <div>5.0</div> <div>11.0</div> </div>	<div> <div>38.9</div> <div>10.8</div> <div>0.8</div> <div>—</div> </div>	<div> <div>N</div> <div>$35^{\circ} 2$</div> <div>E</div> </div>	66.16	88.2	
Nov	<div> <div>Max</div> <div>Mean</div> <div>Min</div> <div>Range</div> </div>	<div> <div>773.43</div> <div>766.84</div> <div>759.90</div> <div>13.53</div> </div>	<div> <div>12.50</div> <div>20.00</div> <div>1.70</div> <div>18.50</div> </div>	<div> <div>13.90</div> <div>8.87</div> <div>3.00</div> <div>10.90</div> </div>	<div> <div>100.0</div> <div>81.7</div> <div>38.0</div> <div>62.0</div> </div>	<div> <div>17.0</div> <div>9.8</div> <div>5.0</div> <div>12.0</div> </div>	<div> <div>44.0</div> <div>11.3</div> <div>—</div> <div>—</div> </div>	<div> <div>N</div> <div>$29^{\circ} 9$</div> <div>L</div> </div>	52.92	57.0	First heavy frost on 11th
Dec	<div> <div>Max</div> <div>Mean</div> <div>Min</div> <div>Range</div> </div>	<div> <div>774.65</div> <div>767.31</div> <div>757.28</div> <div>17.37</div> </div>	<div> <div>5.42</div> <div>19.00</div> <div>— 4.50</div> <div>23.50</div> </div>	<div> <div>10.80</div> <div>5.31</div> <div>1.30</div> <div>9.50</div> </div>	<div> <div>100.0</div> <div>76.0</div> <div>28.0</div> <div>72.0</div> </div>	<div> <div>15.0</div> <div>10.5</div> <div>6.0</div> <div>9.0</div> </div>	<div> <div>70.7</div> <div>14.7</div> <div>—</div> <div>—</div> </div>	<div> <div>N</div> <div>$45^{\circ} 5$</div> <div>W</div> </div>	57.95	4.2	Violent storm of wind on the 6th
1880											
Jan	<div> <div>Max</div> <div>Mean</div> <div>Min</div> <div>Range</div> </div>	<div> <div>779.06</div> <div>771.72</div> <div>762.91</div> <div>16.15</div> </div>	<div> <div>2.54</div> <div>3.70</div> <div>— 6.80</div> <div>10.50</div> </div>	<div> <div>7.40</div> <div>4.47</div> <div>1.70</div> <div>5.70</div> </div>	<div> <div>100.0</div> <div>80.0</div> <div>28.0</div> <div>72.0</div> </div>	<div> <div>21.0</div> <div>12.6</div> <div>2.0</div> <div>19.0</div> </div>	<div> <div>44.4</div> <div>14.3</div> <div>—</div> <div>—</div> </div>	<div> <div>N</div> <div>$23^{\circ} 4$</div> <div>E</div> </div>	38.78	38.3	Slight shock of earthquake on the 11th, at 10.20 A.M.
Feb	<div> <div>Max</div> <div>Mean</div> <div>Min</div> <div>Range</div> </div>	<div> <div>776.00</div> <div>768.74</div> <div>761.55</div> <div>14.45</div> </div>	<div> <div>4.30</div> <div>8.90</div> <div>— 1.60</div> <div>10.50</div> </div>	<div> <div>8.90</div> <div>5.55</div> <div>3.40</div> <div>5.50</div> </div>	<div> <div>100.0</div> <div>88.0</div> <div>51.0</div> <div>49.0</div> </div>	<div> <div>20.0</div> <div>13.5</div> <div>8.0</div> <div>12.0</div> </div>	<div> <div>52.5</div> <div>14.0</div> <div>—</div> <div>—</div> </div>	<div> <div>N</div> <div>$16^{\circ} 4$</div> <div>E</div> </div>	28.57	102.5	19 days of rain
March	<div> <div>Max</div> <div>Mean</div> <div>Min</div> <div>Range</div> </div>	<div> <div>775.72</div> <div>766.92</div> <div>752.97</div> <div>22.75</div> </div>	<div> <div>8.60</div> <div>24.40</div> <div>— 1.20</div> <div>25.60</div> </div>	<div> <div>13.50</div> <div>6.81</div> <div>2.80</div> <div>10.70</div> </div>	<div> <div>100.0</div> <div>80.0</div> <div>32.0</div> <div>68.0</div> </div>	<div> <div>21.0</div> <div>13.0</div> <div>8.0</div> <div>13.0</div> </div>	<div> <div>56.0</div> <div>—</div> <div>—</div> <div>—</div> </div>	<div> <div>N</div> <div>$75^{\circ} 6$</div> <div>E</div> </div>	66.70	37.4	

The above abstract of observations has been drawn up for me by the Rev Father
DECHEVRENS, S J I append as usual three simple rules for reducing the figures to the scales in
popular use —

RULES

To reduce millimetres to inches, divide by 25

To reduce kilometres to miles, multiply by 8 and divide by 5

To reduce degrees C to degrees F, multiply by 9 divide by 5 and add 32

The following return of burials is drawn from the sexton's books and the municipal registers —

BURIAL RETURN of FOREIGNERS for the Half-year ended 31st March 1880

CAUSE OF DEATH	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	TOTAL
Enteric fever			f1*				1
Measles			f1†				1
Asiatic cholera	1						1
Phthisis	1 f1						3
Tubercular meningitis		1‡					1
Dysentery		1§					1
Bright's disease		2	1*				3
Alcoholism				1			1
Cerebellum, abscess of					1*		1
Abdominal cancer	1						1
Bronchitis		1					1
Cardiac paralysis						1 1	1
Heart, valvular disease of			1	1*			2
Liver, acute abscess of		1*	1			1*	3
" cirrhosis of						1	1
Chronic diarrhoea						f1	1
Entrance of air into veins after operation				1			1
Suffocation		1				1*	2
Accidental injury			2*			1	3
Drowned		1		1*			2
Suicide			1*	1			2
Uncertified		1¶		1		2	4
TOTAL	4	9	8	6	1	9	37

* Not resident

† 3 years

‡ 22 months.

§ 11 months

|| 6 years

¶ Portuguese infant

If we strike out 10 deaths from accidental causes, we have to deal with 27 ascribed to disease. Of these, four occurred among infants, and of the 23 remaining, six were furnished by non-residents. The mortality among adult foreign residents is thus reduced to 17 for the half-year—14 males and 3 females,—as against 12 males and 3 females during the same period of 1878-79.

CAUSES of DEATH from DISEASE among RESIDENT FOREIGN ADULTS, October 1879 to March 1880

Cholera	1	Pulmonary affections	4 (1 female)
Bright's disease	2	Cardiac	2 (1 female)
Alcoholism	1	Hepatic	2
Abdominal cancer	1	Uncertified	3
Chronic diarrhoea	1 (female)		

CAUSES of DEATH from DISEASE among the CHILDREN of FOREIGN RESIDENTS, October 1879 to March 1880

Tubercular meningitis	1	Measles	1 (female)
Dysentery	1	Uncertified	1

CAUSES of DEATH from DISEASE among ADULT NON-RESIDENTS, October 1879
to March 1880

Enteric fever	1 (female)	Disease of heart	1
Bright's disease	1	Abscess of liver	2
Abscess of cerebellum	1		

During the entire hot season, but three deaths were reported from cholera, two in August, and one in October. What the nature of these cases was I have no means of ascertaining, but assuredly there was no such thing as an epidemic of cholera last year, and I adhere strongly to my belief elsewhere expressed* that it is mischievous to affix a dreaded name, always associated with epidemicity, to the sporadic cases of acute gastro-enteritis which occasionally prove rapidly fatal here†. Cholera having been reported as prevalent in Kober, vessels from that place were, during the ten weeks between the 12th July and 17th September, detained for examination below the shipping. In no instance was a suspicious case found on board any of the ships thus detained, and the arrangements made by the Customs were such that there was no inconvenience or delay experienced. The briefest study of the death returns given above will suffice to show that no epidemic visited the settlement during the period under review. There was no fatal case of small-pox. In this connexion I would note that according to the Report of the Shantung Road Hospital for 1879, the total number of vaccinations performed during the year was 5,129. At the Gutzlaff Hospital, 1,859 children were successfully vaccinated, and at the same time about 150 tubes were distributed to natives for use in the country. Of the two cases of suffocation, one arose from the careless use of chloroform,‡ the other was an ordinary instance of death from inhaling the fumes of burning charcoal. It is noted on the certificate that the abscess of the cerebellum which proved fatal to a patient in the General Hospital in February (the only death, by the way, which occurred in that month) was secondary to inflammation of the middle ear.

The following cases in foreign and native practice present each some points of interest —

Glandular Tumour of Neck, Operation, Entrance of Air into Veins, Death — A well-grown male child, aged six years, with excellent family history, several brothers and sisters all living and healthy, had presented during eighteen months a gradual enlargement and induration of the cervical glands on the right side. For two months the enlargement had progressed rapidly, and at the same time the child had presented vague symptoms of failing health, such as irritability, occasional loss of appetite, disturbed sleep, etc. Deglutition had never been interfered with, but within a few weeks there had been occasional attacks of

* *Customs Medical Reports*, xvii, 24.

† In the Report just cited, p. 25, I narrate two cases which I and everybody else would class as cholera did they occur in the course of an epidemic. As these sheets are passing through the press, a case similar though not so severe has fallen under my observation. A foreigner in the prime of life and in perfect health, without assignable cause, was seized with ordinary diarrhoea, followed within a few hours by serous vomiting and purging, with intense thirst, and cramps in the left leg. There was so much restlessness that an accurate thermometric reading could not be obtained. The surface of the body was wet and cold, the tongue and breath cold also. Colourless discharges in painless gushes had continued for two hours when I saw the case. The fluid vomited was alkaline, but this may have been due to admixture with seltzer water, which the patient had been supping freely but in small quantities at a time. Here, as in the previous cases, the application of mustard and heat, and the administration of morphia and atropia subcutaneously, cut short the symptoms, and convalescence was speedily established.

‡ The verdict of the jury called to serve on the inquest was "that the deceased died from the accidental inhalation of chloroform from a towel placed on his face to relieve neuralgic pains."

dyspnœa, and respiration was difficult, except in a carefully chosen position of the head. The increasing urgency of the symptoms and the child's distress on account of his deformity rendered interference of some kind imperative, and as every imaginable local and general remedy had been patiently tried during many months, without any effect on the progress of the growth, extirpation was the only measure left to be adopted. On the other hand, many considerations seemed to recommend delay, and especially the fact that some six months previously, that is to say, shortly before the rapidity of increase in the neck tumour became strongly marked, the child's wrist girth was observed to enlarge by about 4 inches, and deep palpation detected elastic masses in the abdomen. The process began in the superficial glands, but it was supposed that the deep glands were also implicated. At no time could the mass be raised from its bed, so as to get the finger beneath any portion of it. There was no enlargement of the veins of the face, but the surface of the tumour was covered by a network of engorged vessels. It turned out in fact that, as the result of pressure, the superficial and deep fasciæ, with the intervening platysma and hypertrophied glands were fused into one lobulated mass, whose superimposed elements could not be distinguished from one another, but there was no proof furnished by the operation of any implication of the deep cervical glands. On a final and careful examination, the tumour was found to extend from behind the mastoid process to the clavicle, and probably beneath this bone, and from a point one inch outside the transverse processes to close on the trachea, the anterior portion considerably overlapping the ramus of the lower jaw. In consultation it was decided that the extreme risks of operation were less to be dreaded than the slow and distressing death by which the child was threatened, and removal was therefore resolved upon. An elliptical incision, extending from 25 mm above the highest point of the tumour to the middle of the clavicle, and enclosing at its widest part about 65 mm of skin, exposed the tumour sufficiently, and gave ample room. The mass was dissected out from behind forwards, the attachments being carefully stretched on the finger before being severed, and teased with the handle of the scalpel wherever vessels were expected. Every vessel was tied before it was divided, the posterior auricular and external jugular veins being the only large veins seen, but all, great and small, being tied without distinction. Only one large artery was encountered, and this was ligatured in two places and cut between. It was about the size of the adult radial, but I am not certain as to the vessel of which it was a branch. The tumour was found to pass down behind the clavicle, beneath the cervical fascia, but it did not dip beneath the sterno-mastoid, which lay cleanly dissected in the wound. The portion behind the clavicle was drawn into view, its attachments unravelled and divided by gentle twisting and tearing. The sheath of the cuotid was not seen, but the finger in the lower angle of the wound was in contact with that vessel and with the subclavian. The operation lasted 35 minutes, about two ounces of blood was lost, and about one fluid ounce of chloroform was used, sprinkled on an open flannel inhaler. Towards the close, the circulation became very weak, but breathing was good. Just as the last attachments of the tumour were separated, breathing ceased, but lowering the head, pulling out the tongue, and artificial respiration re-established it immediately. Chloroform had been withdrawn for some minutes, and one point of suture had been inserted, when, on piercing the skin for the second stitch, the child gave a deep inspiration, there was a faint hissing sound, the lower bowel was emptied, face and lips became blue, and breathing stopped altogether. Meanwhile the child had been surrounded with hot bottles, the window was thrown open, and artificial respiration was begun. This was kept up for 15 minutes, but the wide dilation of the pupils from the moment that the hiss was heard showed that death had occurred at that moment. The weight of the tumour was not exactly ascertained, but it was about 133 kilo.

It is possible that chloroform was withdrawn a little too soon, for had the child been insensible to the needle puncture, the deep inspiration, which seemed to have displaced an imperfectly formed clot, would not have occurred, or would have been postponed until after the vessel concerned had been more securely sealed. This vessel must have been a very small one, considering that there had been no bleeding from it, and that it had escaped observation. We

ascertained after death that all the ligatures placed were still undisturbed. Its insignificance in point of size was compensated by its nearness to the great venous trunks of the chest, and its exposure to the suction action of the right heart. But the chloroform was a danger in itself, and having seen that it was beginning to be badly borne, I was anxious to withdraw it as soon as possible. Indeed, here it was a choice of dangers, as from the first there had been a choice of evils.

Fibrosarcoma of Upper Jaw, Operation, with Preservation of Infra-orbital Plexus, Recovery—A Chinese woman, aged 40, was admitted to the Gutzlaff Hospital on the 1st January 1880. For the past three years she had been sensible of an enlargement of the left superior maxilla, with severe neuralgic pain radiating over the entire left side of the face, and lately œdema of both eyelids, and epiphora. What, however, gave her most distress was the progressive destruction of the palate, the left side of which was occupied by broken-up bone and a soft ulcerating mass, which continually filled her mouth and fauces with bloodstained mucus of very offensive smell. For several weeks she had been unable to sleep for more than a few minutes consecutively, a feeling of suffocation rousing her as soon as the discharge collected in the throat. From this cause and from inability to eat, she had wasted considerably. On examination, the palate was found to be as described. Division of a few bundles of mucous membrane exposed the greater portion of the palate process lying dead and loose. This was removed, and thereby a measure of relief was afforded, sleep for longer periods being at all events rendered possible. The cheek was deformed to the size and shape of a mandarin orange, the left eye was protruding slightly, and sight was beginning to fail. The left nostril was blocked by the tumour, which seemed to have pushed the middle and inferior turbinated bones and mucous membrane into contact with the vomer and perpendicular plate of the ethmoid, but without invading their tissue. Excision having been proposed and accepted, no difficulties were encountered in the operation. An incision from the internal canthus to the middle of the upper lip enabled the cheek to be lifted without trouble, and the entire of the tumour was easily exposed to view. The only point in the operation worthy of notice was the careful isolation of the infra-orbital plexus, which was dissected up along with the cheek to the border of the foramen, where the trunk of the nerve was isolated. A fine saw was carried round it, and the incision followed the circumference of the orbit from the nasal process to the maxillary process of the malar bone. The maxilla was then loosened in the usual way and twisted out with lion forceps, the palate bone, which was equally involved in the tumour, coming away with it. The edge of the orbit was thus preserved along with the nerve, but the orbital surface of the bone accompanied the tumour, leaving the under half of the eye exposed. No vessels were tied. The cavity was stuffed with boracic lint, and recovery was uninterrupted. On the eighteenth day the patient left the hospital at her own request, when the following note was made—"Very little distortion of face, cavity about one quarter its original size, and lined by exuberant vivid granulations, right maxilla seems much pulled over to left side, no wasting of cheek, complete command over facial muscles, cutaneous sensibility intact." Six months after operation there is no threat of recurrence.

The tumour was found to involve the entire of the left superior maxilla and left palate bone, except the dense ridge at the border of the orbit. To the naked eye it appeared to be a soft fibrous growth, probably originating in the antrum, which was completely obliterated. The anterior bony surface had been to a great extent absorbed, leaving the tumour in the form of a homogeneous, elastic mass, rudely preserving the original shape of the bone. It contained no cysts. On microscopic examination of sections from different parts, it was found to consist of short fibres with plentifully interspersed nuclei, but I could find none of the oat-shaped nucleated cells upon which PAGET lays stress as prognostic of recurrence.

I am, however, far from certain that the growth will not recur. Meanwhile the general health has been re-established, and life has become once more enjoyable. The plan of preserving

the infra-orbital plexus is due to M LETIÉVANT, who recommended it in 1876 at the annual meeting of the *Association française pour l'Avancement des Sciences*, and supported his recommendation by cases. In the instance just narrated, and in one other in which I operated in accordance with M LETIÉVANT's views, the result as regards preservation of the form of the face, muscular power, and sensibility was distinctly better than in the few other cases in which I have been called on to remove the upper jaw.

Scrotal Hernia, rendering Patient unfit for work, Wood's Wire Operation, Cure, with Development of Hydrocele—A middle aged native was admitted to the Gutzlaff Hospital with a right scrotal hernia of long standing. His business compelled him to be on his feet for several hours daily, and shortly after beginning work each morning the bowel formed a protrusion as large as two fists. Reduction could always be easily performed as soon as he lay down. He was very despondent about his condition, and constantly suspicious of those around him, fancying that they were ridiculing him, plotting against him, and circulating abominable stories about him. His bowels were sluggish, and he suffered much from internal piles, losing considerable quantities of blood from time to time. Could not get a truss to fit him. After reduction, the canal admitted two fingers easily, the edges of the external ring being sharply defined. Wood's operation by wire was performed, no particular difficulty being encountered. Although 35 mgr of morphia was injected subcutaneously immediately after the operation, he shortly became very restless and complained of much pain. He then confessed to being an opium smoker, whereupon 50 mgr was injected, and he was allowed 2 fluidrachms of laudanum daily. On the third day he was attacked by pneumonia on the right side, which ran an acute course, and terminated in 10 days. During most of this time he took milk congee freely. There was no belly tenderness, but the cough caused much distress, and severe pain in the wound and its neighbourhood. On the fifth and seventh days castor oil was given. On the ninth day the wires were untwisted and cut. The canal was occupied by a firm mass, but there was a good deal of discharge. The scrotum was much swollen. On the eleventh day the wires were withdrawn, and from this out convalescence, though very slow, was uninterrupted. By the thirtieth day the wounds were completely healed, and there was no tendency to protrusion on forcing a cough in the erect position. Two days later it was noticed that the testicle was swollen. The swelling increased gradually for a week, when puncture gave issue to about 5 fluidrachms of serum. The patient refused to allow iodine to be injected, and the sero refilled to its size previous to puncture, when it became stationary. Six months later the condition of affairs was unchanged.

In five cases (among males) of delusions of persecution which during the last few years I have had under observation (two of them terminating by suicide), hernia was present. This is perhaps merely an accidental coincidence. It is worth noticing, however, that the patient whose case is related above lost all his suspicions after his cure. Whether in this respect recovery was permanent I cannot say.

Scurrhus of Breast, Extensive Infiltration of Axillary Glands and Pectoral Muscles, Operation, Favourable Progress, Epilepsy, Death—A native woman, aged 43, was admitted to the Gutzlaff Hospital with a tumour of stony hardness occupying the right breast, the skin covering which was purple, shining, and traversed by large veins. There was no ulceration, but the tumour was firmly adherent to the chest wall, and at its superior and external angle extended along the great pectoral, and filled in the axilla. The patient stated that she first noticed a small, well defined lump on the inner part of the gland three years ago. The nipple was now very prominent and irritable, covered with a weeping eruption, and fissured in several directions. She was confident that the nipple was not affected in any way until long after she first noticed the tumour. Her general appearance was healthy. Her object in seeking operation was to obtain relief from the inconvenience caused by the size and weight of the growth. It was only within a few weeks, and long after resolving to have the tumour removed, that she had suffered from occasional paroxysms

of violent pain in the right arm and right side of head and neck. The breast was removed by an elliptical incision through healthy skin. A very large portion of the great pectoral was cut away, leaving the periosteum of the ribs exposed in one place over a space larger than a dollar. The infiltrated muscle was followed up to the humerus, and every portion that appeared in any way suspicious was removed. A mass of axillary glands was enucleated with the fingers. All the vessels were twisted, and no attempt was made to draw the edges of the wound together. Immediately after the operation the wound measured 24 cm in greatest length by 11 in breadth. The first dressing was changed after 48 hours. The wound had already contracted considerably, and was looking quite healthy. The general condition was reassuring. The temperature had not risen above 38° C, appetite was fairly good, and although the night after the operation had been disturbed, the succeeding night had been excellent. On the morning of the sixth day, the woman sat up in bed to eat, and rose to take a turn round the ward on the seventh day. On the eighth day, as the wound was about to be dressed, she complained of feeling fatigued, and asked to be left till the afternoon. Half an hour afterwards she was found in an epileptic fit, became comatose, and died. On inquiry from her husband, it was ascertained that she had been epileptic from her youth, attacks occurring on an average twice a month.

When inquiring into this woman's history, I did not think of asking whether or not she was epileptic, and I do not suppose that knowledge of the fact would have influenced me in deciding the question of operating. ECHEVERRIA* remarks on the immunity usually enjoyed by epileptics from the dangers incident to extensive wounds, operative or other, but here it was not the effect of the latent epilepsy on the wound or on the general condition which had to be noted, but the effect of the wound on the fatality of the next occurring epileptic paroxysm. It is not certain, but it is probable, that but for the enfeeblement which followed so extensive an operation, this apparently healthy woman of middle age would have got through her attack on this occasion as she had done on innumerable previous occasions. On the other hand, it is possible that the operation had nothing to do with the event. But, bearing this case in mind, it would seem wise to avoid any operation not urgently called for in epileptics, and at all events to make previous epileptic seizures the subject of inquiry in all instances. Had I done so in the case just reported, I would have dosed her largely with bromide of potassium before the operation, and up to the complete closure of the wound, and it is reasonable to suppose that this treatment might have postponed the occurrence of an attack.

Enormous Hypertrophy of Clitoris, Removal by Écraseur, Cure—A married woman, aged 32, with one child four years old, presented herself at the Gutzlaff Hospital with a pyriform tumour, not sensitive on being touched, covered with rugous skin, ulcerated here and there, which occupied the vulva. She was positive that the growth was not congenital, she had noticed it for the first time shortly before the birth of her child, and it had progressed slowly and painlessly ever since. For several months she had been obliged to carry it in a suspender, but even with this device, the standing posture gave rise to agonizing pain down the interior surface of the thighs. This pain and the distress and annoyance caused by the tumour led her to seek advice. She had already, it should be remarked, swallowed the value of several hundreds of dollars in the shape of native internal remedies. On examination, the left labium majus was found involved in old inflammatory thickening caused no doubt by the constant irritation kept up by the tumour. The right labium was free. The dragging had deformed the parts very considerably. The left nymphæ, except for its anterior half, looked healthy. A circular incision, embracing the pedicle about 6 mm above its attachment, was carried through the altered mucous membrane, and two small flaps dissected. The diameter of the pedicle was about 30 mm. This was divided by the steel-wire écraseur, without any

* *Archives Generales de Medecine*, 1878, II, 673

loss of blood, and the flaps laid over the stump and united by two points of suture. Union was immediate, and the parts resumed their natural appearance after a few days. The tumour was dense and fibrous on section, and weighed 1,270 grammes.

In this case there was no suspicion of syphilis, and a careful examination of the woman's throat, skin, neck and groins failed to afford any evidence of such taint. Authorities, while admitting that these growths arise independently of syphilis, refer most cases to this as cause. The affection is, I think, of very rare occurrence among the Chinese. During 11 years of constant surgical practice at hospitals for natives, I have seen but this one instance of it.

Medullary Cancer of Cervix Uteri, Enlargement and Fixation of Uterus, Profuse Haemorrhage, Operation, Favourable Result, Accidental Complication, Death—A Chinese woman, aged 34, was seen in private. For eight months she had suffered from severe losses, with little or no pain. Lately, hæmorrhage was profuse, and was excited by the slightest movement. When bleeding was not present there was a constant watery discharge of faint odour and slightly coloured, which excoriated the skin. For the past month she had been confined to a couch, where she lay doubled up, as even stretching the legs produced bleeding. Frequent calls to micturate interfered with sleep, and appetite had almost disappeared. On introducing the finger into the vagina, a mass, soft in portions, but generally elastic, was encountered at a distance of about 5 cm. This filled the canal, but with some coaxing the finger could be got behind it, and then curved completely round it. Above it, and level with the roof of the vagina, was a narrow zone which seemed free from disease. The body of the uterus, smooth but hard and enlarged, could be felt behind the pubes, and though it was difficult to make out this point exactly, it appeared to be fixed. Examination by the rectum was very painful. Movement could not be imparted to the uterus from it, but the anterior wall was free as far as the finger reached. Very severe hæmorrhage followed the examination, but was arrested by the application of perchloride of iron lint to the ulcerated surfaces, and the introduction of a sponge wrung out of a 5 per cent solution of carbolic acid. The litter was removed the same evening, and bleeding did not recur until next day, when, on moving from the couch, half a large chamber-pot of blood was lost, and alarming syncope came on. There were two enlarged but indolent glands in each groin. The local condition and the general state opposed any idea of operating. On the other hand, the woman's condition was desperate and could not be made worse by any treatment. She urgently demanded operation, and as it was at least possible that the disease was still limited to the cervix, it was undertaken after a full acceptance by her of all the risks. She was accordingly removed to the Gutzlaff Hospital. Having been chloroformed, the steel-wire of an courseur was with great difficulty got into position above the mushroom-like mass presented by the tumour, and an attempt made to draw the uterus down, which failed completely. Moreover, on account of the angle at which the loop was bent, the tube of the instrument could not be brought into contact with the part which I wished to divide. The wire was therefore removed, and the vagina, the lower portion of which was now filled with clots, bleeding having been very severe during this fruitless manœuvre, was plugged. Chloroform was withdrawn, and about an ounce of brandy administered. The zone previously occupied by the wire was now pierced from side to side, at points as nearly equidistant as possible, by three of Davis's hernia needles, whose points were then capped, a matter of very great difficulty. A stout piece of tape was got above these, and drawn as tightly as possible, bringing the uterus down perhaps a very little. The entire mass occupying the vagina was then cut away with a stout probe pointed, curved bistoury. The traction on the tape immediately pulled the needles through the edges of the stump, and I feared a terrific hæmorrhage. Nothing of the kind occurred. The vagina was syringed out with hot water, and the largest size glass speculum was introduced. Three vessels were seen smartly spouting, but were fortunately caught, and then orifices touched with a fine pointed iron at a low red heat. There was slight oozing, which soon ceased. The surface of the section, which looked healthy, was then dressed with pledgets of dry non lint, and the vagina was tightly plugged with strips

of lint wrung out of a warm solution of carbolic acid (about 1 per cent). The operation was performed on the 14th September 1879. The bladder irritability ceased immediately, urine having been passed only once during the following night. There was no pain, the patient slept well (35 mgr of morphia subcutaneously), and next morning the temperature was $38^{\circ} 7$, rising to 39° in the evening. On the morning of the 16th (temperature 38°), the lint was withdrawn, the iron lint remaining. It was hardly stained. Appetite had returned, and milk and rice, with mutton broth, were taken freely. On the 20th she ate some fish, and this day the non lint came away. Meanwhile warm injections of CONDY'S fluid were used three times daily, although there was hardly any discharge, and that not offensive. The recumbent position was constantly recommended, and it did not seem likely that she would disobey. Colour had returned to the lips, and the general appearance was excellent. The bowels were opened by enemata on the 20th, as colic was complained of. On the 22nd, while left by herself, she rose and arranged her hair, sitting by an open window. She got cold, and the evening temperature was $39^{\circ} 5$. A dose of quinine and compound ipecacuanha powder got her out of this scrape, and next day she was well again. But, unfortunately, she had been allowed to have her own servant to wait on her. This woman, during the dinner hour on the 24th brought two buckets of cold water into the private room occupied by her mistress, and assisted her in taking a cold bath. That night I was sent for, as she was thought to be dying. She was unconscious, tossing from side to side, temperature in the rectum 41° . She could not be got to swallow. An enemata of 15 grammes of quinine was returned, and was repeated after six hours. On the morning of the 25th she was conscious, told what she had done, and expressed her conviction that it was now all up with her. Her temperature was 40° . She insisted on being removed to her home, but was persuaded to stay. Next day (26th) she was so importunate to be removed that she was permitted to go, and she died the same afternoon.

The mass removed presented no trace of the healthy tissue of the cervix, except here and there, supposed to be in spots answering to the surface of section. It was impossible to reconstruct the tumour from the pieces. Certain portions were reduced to a pulp, which when evacuated left more or less cleanly excavated depressions, on the surface of which the lumina of vessels were distinct. The firmer portions showed on section a fibrous mesh enclosing nucleated cells, chiefly circular and oval, with here and there a brilliant nucleolus. Circumstances prevented the microscopic examination from being very minute.

The immediate cessation of hæmorrhage after the operation was remarkable and unexpected. I am satisfied that but for the patient's obstinacy she would, at least for a time, have recovered health and strength, though what her ultimate fate would have been is doubtful. It was fortunate that the écraseur did not work. The section left after the tumour was removed was flush with the roof of the vagina, and it is well known to all surgeons familiar with the écraseur that it removes in reality much more than it has the air of removing. The cavity of the abdomen would have been opened, I have no doubt, had the first attempt succeeded, and although SWEET was once lucky enough to get a recovery after this accident,* such good fortune is not to be counted on.

Pyæmic Abscesses of Liver (8), Aspiration of Two, Temporary Relief, Death—A stout, well-built foreigner, aged 36, long resident in the East, confessing to having been a free liver, had had dysentery a few months before coming under observation, and had never got quite rid of it, though it alternated with obstinate constipation. When I saw him he was deeply jaundiced, and his chief complaint was of constant vomiting. There was no dyspnoea. The surface was cold (temperature in the mouth $35^{\circ} 8$ C), the pulse was 126, small and compressible. Tongue dry, no delirium, no history of rigors. He could lie equally well on both sides, and suffered from no pain. Liver dulness extended from the nipple level to a line drawn across the body 5 cm above the navel, and extended $12\frac{1}{2}$ cm into left hypochondrium. Behind, the lung

* *Clinical Notes on Uterine Surgery*, p. 202

was hardly, if at all, encroached on. There was tenderness on percussion at a point a little to the right of the middle line, and $2\frac{1}{2}$ cm below the costal border. Here obscure fluctuation could be made out. Urine, scanty and high coloured, no albumen. Vomiting was partly controlled by hydrocyanic acid internally, and subcutaneous injections of morphia, so that a little iced milk and soda-water, chicken broth, or brandy and water was from time to time retained. A castor oil enema brought away a quantity of brown black scybalæ, and afforded a good deal of relief. Next day the temperature was normal, both morning and evening, fluctuation was very doubtful, and there was less local tenderness. Champagne and hard biscuit were retained. On the following morning all the symptoms were aggravated, there was total loss of appetite, inability to sleep, and great restlessness. I introduced an aspirator needle at the point previously marked, and withdrew 75 grammes of thick yellow pus, mixed with a little blood. Relief was immediate, the patient asked for some food, ate a biscuit and drank a glass of champagne, and slept for three hours in the afternoon, waking in a bath of perspiration and very cold. He was rubbed dry, a hot bottle put to his feet, and he chatted cheerfully with some friends. Next day he had relapsed into his former condition. An enema was again administered, and 25 grammes of pus, now largely mixed with blood, was withdrawn at a point 3 cm from the former puncture. From this out he sank rapidly, and died 12 hours later.

The liver was alone examined. The left lobe contained two abscesses, both superficial, one about the size of an orange, the other that of a walnut. The right lobe contained four, exclusive of the two which had been evacuated. Of the four, three were deeply placed, and one was almost in contact with the peritoneum, a little in front of the axillary line, and immediately behind the lower border of the false ribs. The needle tracks were visible, but there had been no escape of fluid along them. There was no ascites.

Cancer of Kidneys and Liver—A man, aged about 45, engineer of a steamer, many years resident in China, and much broken down by excesses of various kinds, suffered during the early part of the summer of 1879 from frequent attacks of vomiting, often accompanied by dysenteric symptoms. The nausea was capricious, coming on sometimes immediately after eating, at other times being absent for several days. So also there would be occasionally, for two or three days at a time, eight or ten passages containing mucus and blood, with little or no feces, and then for a day or more there would be solid stools, always very dark in colour. The tongue was generally white, with red tip and edges, but was occasionally dry and fissured, without there being at the same time any increased bodily heat. The temperature under the tongue, in fact, varied between 36° and 37° until the day before death, when it remained at 35° . The patient never suffered any pain, was not at all anxious about his condition, and remained on duty up to 10 days before his death. His general appearance was suggestive of malignant disease. There was nothing to be discovered in the chest. The urine was scanty (about 800 cc), very frequently voided, contained a trace of albumen, no sugar, specific gravity 1.011 to 1.018. The liver was small, the upper limit of dulness normal, but the lower limit in the mammillary line was at least 3 cm above the costal margin. Posteriorly, the entire surface was dull on percussion from the tenth dorsal vertebra downwards. Nothing could be made out by palpation. The glands in the inguinal region were hard, somewhat enlarged, but indolent. Ten days before the man died he laid up, and from this out, the quantity of urine voided rapidly diminished, until on the fifth day the secretion was completely arrested. Three days later, vomiting and diarrhoea ceased spontaneously, and for two days the patient remained perfectly quiet, though not sleeping, rather dull as to intelligence, but able to dictate his will and letters to his family, taking a little iced milk from time to time, perspiring very profusely, but presenting no urinous smell on his breath or from his skin. On the morning of the sixth day after the cessation of the urinary secretion, or, more accurately, 117 hours from the time of the last discharge of urine, he became comatose, and died in two hours.

At the *postmortem*, the heart was soft and small, the lungs were healthy, but slightly emphysematous at apices. The stomach was the seat of a simple chronic inflammation, the mucous surface of the intestines was healthy, except in the rectum, which was chronically inflamed throughout its whole extent, and the lower 15 cm of the ileum, which was scarred and puckered, and diminished in calibre by about one-fourth, the traces of long past ulceration. Pretty generally distributed over the peritoneal

surface were minute pigmented granules of cancerous nature. The liver was finely nodulated, or rather granulated, on the surface, contracted, weighed 1,566 grammes, was adherent to the diaphragm, and cried under the scalpel. Close to the edge of the right lobe were four hard nodules, occupying the whole thickness of the organ. They were easily shelled out, and when cut and squeezed exuded a milky fluid. Sections from several portions of the liver were examined microscopically, but nowhere was unaltered liver tissue found. In the neighbourhood of the nodules, the fibres of the condensed connective tissue were occasionally separated from one another by collections of cancer cells, but between these collections, and between them and the fully-formed nodules, the connective tissue, with its characteristic cells here and there unaltered, betrayed no sign of the neighbourhood of cancer. There was thus no general or extensive infiltration, nor were nodules found anywhere else than in the limited region just mentioned. The hepatic cells were darkly pigmented, and seemed to be enlarged, but at the moment I had no normal section at hand for comparison. The biliary ducts were irregularly dilated, as I believe they always are in cirrhosis. The gall-bladder, the two trunks of the hepatic duct, the cystic and common ducts were all contracted, but otherwise appeared healthy. The right kidney weighed 245 grammes, and consisted of a soft brain-like mass in which none of the proper renal tissue could be discovered. In the centre was a cavity as large as a small walnut, containing detritus and a yellow fluid. The left kidney was small, hard, and nodulated on the surface. On section, about two thirds of the gland was found occupied or replaced by a medullary growth, the remaining third and the pelvis being seemingly unaffected. The right ureter was contracted, so that an ordinary probe failed to pass into it from above, the left ureter was of natural appearance and calibre. The bladder was empty and firmly contracted. The abdominal cavity contained about 500 cc of faintly tinged serum. There was no ascites.

The absence of more marked uræmic symptoms, in spite of anuria persisting for so many days, may probably be explained by diminished production of urea, and this, in turn, by the condition of the liver. The case is interesting, and even important, as illustrating the views of those physiologists who consider the liver as the seat of urea formation. It is also interesting as an instance of the relations which bind together the kidneys and liver, relations which, from the pathological side, are most frequently illustrated by the liability of all three glands to the simultaneous occurrence of cystic degeneration.

Aphasia (Temporary) with Left Hemiplegia, Improvement—A civil mandarin, aged 57, came under observation last October. He was short and spare, but strongly built, and stated that he had always enjoyed excellent health. Married at an early age, he had never suffered from any venereal affection. For many years he had occupied posts of great responsibility, the anxieties attaching to which had constantly interfered with his rest and sleep. Ten months previously he was particularly harassed by work, and had passed several sleepless or nearly sleepless nights in succession, but had noticed no other symptoms of impending illness. He was about to finish up his immediate cares by a dinner with the Viceroy of one of the southern governments, at whose residence he was staying, when, just as he was seating himself, he complained of feeling ill, immediately lost consciousness, fell to the ground, and was carried directly to bed. There were no convulsions. Next morning it was noticed that his mouth was dragged to the right, and that his left side was powerless. "After a few days" consciousness returned, but he was speechless, confused in his mind, and from time to time showed much mental distress, without apparent cause. "Gradually" he began to use single words, sometimes incorrectly, but usually correctly, until "after a few tens of days" he could speak as well as ever, and had lost his exaggerated emotional sensibility. He was able to write down what he wanted before he quite regained the power of asking for it verbally. He could often, but not always, understand what was said before he became able to write. At first he swallowed with difficulty, but this condition "soon" disappeared. Presently he began to transact business as usual.

About three months after the attack a certain amount of power was regained in the left leg, so that he could walk with the aid of a man supporting him. It was then first noticed that the fingers of the left hand were forcibly flexed into the palm*. This contraction went on increasing, until "at the end of four months," whenever the hand was left to itself, the thumb was flexed into the palm, the fingers over the thumb, and the hand on the forearm, which was pronated. From the first there had been severe pain on the left side of the head. Of late this had become more severe but less continuous. There had also always been a great deal of toothache. (Both these pains were perhaps due to a carious left lower first molar). Appetite good, sleeps well for about five hours every night, has a healthy motion every day. Urine natural in appearance and quantity. His memory is perfectly good, and he daily transacts an enormous amount of public business involving much writing. About a month previous to my seeing him, he was attended by the native assistant at a foreign hospital, who ordered him some foreign medicine which made his entire body twitch. He took two bottles of this, with an interval between, but it made his headache worse, and seemed to tighten the contraction of his hand†. Ever since the attack he had been taking ginseng on his own account. With the exception of the twitching induced by the foreign medicine, his condition had not sensibly changed for four months.

This was his story as told by himself, his friends, and a confidential servant who had witnessed the attack and had attended him constantly since it. It leaves much to be desired in precision as to the phenomena attending the attack, the order in which subsequent symptoms appeared, and the intervals that separated them. The date of the appearance of exaggerated tendon reflexes had, of course, passed unnoticed. After examination the following notes were made —

Two attempts at ophthalmoscopic examination failed, partly through difficulty about light, partly because I did not wish to frighten the patient by interfering with his vision, and therefore attempted to explore the fundi without dilating the pupil, but chiefly in consequence of the patient's nervousness about the proceeding. The general appearance was that of good health. The folds of the skin of the face were more marked on the left side than on the right, but when the patient spoke or laughed, the healthy muscles on the right side overcame the slight contracture, and flattened the paralysed side. The tongue was protruded nearly straight, with a trifling deviation of the point to the left. Its movements were quite unrestrained. The paralysed limbs were very slightly, if at all, wasted. The left hand was colder than the right, but the skin of the arm, leg and foot (covered) was sensibly the same as on the right side. The pulse at the left wrist was perceptibly smaller than at the right. The superficial arteries were apparently healthy. The heart was healthy, there was no cough, and a very minute examination of the lungs failed to reveal any mischief anywhere. Urine, specific gravity 1.018, faintly acid, contained neither sugar nor albumen. The patient was not left-handed, nor had he either in childhood or adult age shown any tendency to use his left hand with unusual freedom or frequency.

The left arm in repose was closely applied to the side, but was fairly movable from the shoulder-joint. It could be rotated, and moved backwards, forwards, outwards, and inwards, but could not be raised vertically. The forearm and hand were as above described. The fingers could be voluntarily unclosed to a very slight extent, and still farther, but not at all completely, by the aid of the other hand. It was as

* Contracture usually presents itself about the middle of the second month. VULLIAN relates a case wherein it appeared on the twentieth day.

† This was no doubt strychnin. It has long been known that "after the administration of nuxvomica, paralysed persons exhibit a notable stiffness of their affected limbs, which persists, although the use of the drug may have been long suspended" (FOUQUIER *Mémoires de la Société de la Faculté de Médecine*, 1820, quoted by CHARCOT in his lectures at the Paris Faculty, session 1879-80). The tendency to exaggerated tendon reflexes antecedent to and contemporaneous with post-hemiplegic contracture is greatly increased by strychnin, which hastens the progress of events in a very marked manner.

difficult to exaggerate the flexion of the wrist as to overcome it. The patient was unable to walk, but could stand for a minute or so unsupported, and whether his eyes were open or shut. The left foot was in forcible extension. By an effort he could place it nearly flat on the ground, but could not keep it so. When sitting he could push forcibly with the heel. There were occasional startings in the leg muscles. WESTPHAL's patellar tendon reflex was present on the right side, and greatly exaggerated on the left. The *Fussphänomen* (ankle clonus) could not be elicited on the right side. But when I hung the left leg over my hand supporting the ham, and suddenly lifted the point of the foot, a series of muscular shocks so violent was produced that the patient and his friends were seriously alarmed, and I did not care to repeat the experiment. The voluntary act of putting the foot to the ground, which, of course, was always performed slowly and gently, never produced any of these symptoms of spinal epilepsy.

Cutaneous sensibility was equal and normal in both arms. In this respect there was but little difference between the two legs. The æsthesiometer points were felt as two at 37.5 mm apart all over the outer surfaces of both, and at 35 mm apart on the inner surfaces. Occasional formication was complained of in the left arm and leg, but chiefly in the leg.

He was ordered a mixture containing iodide and bromide of potassium with iron and quinine, and a generous diet, with port wine. The hollow tooth was kept plugged with cotton wool soaked in creasote.

A week later, when seen again, he was free from headache. The condition of the arm was unchanged, but the leg was so far improved that he could walk the length of a moderately sized room (about 6 metres) without support. The æsthesiometer points could be distinguished at a distance of 22.5 mm on the inner surface of the left leg. After another week there was a further increase of sensibility on both sides, the points being distinguished at 15 mm. He walked more steadily. There was no change in the hand, except that when lying down and warm in bed, he noticed that he could open it farther than before or than when he was sitting up. But this had probably been the case all along, and had merely escaped observation.

The patient now left Shanghai, but was seen one month later, and again after six more weeks. There had been very little further improvement, if any, except in the power of walking. This continued to increase, in consequence, I think, of a general improvement in health, due to careful and liberal diet, tolerably free use of wine, and diminution of work.

*H—Dr P MANSON'S Report on the Health of Amoy for the Half-year
ended 31st March 1880*

THE health of the foreign community during the six months has been unusually good. Very few cases of serious sickness have occurred, and I have to record but one death. There has been no epidemic of importance either among foreigners or natives, and the usual spring small-pox epidemic has passed over very lightly.

The death referred to was caused by abscess of the liver. Though the case terminated in November, the disease was acquired during the previous six months, the first symptoms having appeared in July.

I—Dr J G BRERETON's Report on the Health of Chefoo for the Half-year
ended 31st March 1880

ABSTRACT OF THERMOMETER OBSERVATIONS

MONTH	Highest	Lowest	Average	No of Days Rain or Snow	MONTH	Highest	Lowest	Average	No of Days Rain or Snow
1879	°	°	°		1880	°	°	°	
October	74	40	57	4	January	41	13	27	5
November	64	29	46	2	February	45	14	29	5
December	58	20	39	5	March	69	22	45	4

The lowest reading was 13°, being 3° higher than during the corresponding period last year

The winter, on the whole, was comparatively mild, the health of the foreign community being at the same time exceptionally good. There was almost a complete absence of serious affections, cases of ordinary catarrh, associated in some instances with bronchitis, occurred, however, not infrequently, but these were generally traced to undue exposure, and are liable to take place in any climate. During the latter part of the winter, or early spring, many individuals remarked a wonderful development of electricity in the air. During the operation of dressing the hair, in some instances large sparks of electricity were quite visible, but it has not been yet determined if an electrical condition of the atmosphere has any effect upon health or disease. Very little snow fell during the winter, and severe storms were infrequent, so, instead of having bitterly cold storms, as is usual during this season, we have had fine, clear, bracing weather, which imparted a sense of vigour and inclination for daily exercise. This latter was indulged in to a considerable extent, and I have no doubt contributed not a little to the general good health of the community.

During the period under observation there were four births and one death.

One of the labours was the most severe which has taken place in Chefoo for a considerable time. The labour pains were not at all strong. In fact, it was what is generally known as a "tedious" case. Presentation natural. About nine hours after the beginning of the second stage it was found that the head was impacted at the bium. BARNES' long forceps were applied. Subsequently chloroform was administered, as the pain produced by the effort at delivery was not well borne. Gentle traction on the blades of the forceps, which were applied over the parietal regions of the child's head, did not make the slightest impression. Increased force only caused the instrument to slip. After two or three attempts, the patient was allowed to recover from the effects of the chloroform. She then rested quietly for a couple of hours, when the pains returned slightly. Inability to urinate now set in, the vagina at the same time becoming dry, hot and sensitive, consequently I determined to deliver at once by forceps, or, failing in this,

to resort to craniotomy Chloroform was given, the catheter was passed with difficulty, and the instruments again applied They slipped as before whenever much force was used, but they were re applied each time they slipped, and after about 35 minutes the head was found to yield readily, and finally was brought down to the perinæum At this stage I replaced the long forceps by CHURCHILL'S short forceps, which I found to act admirably, and enabled me to deliver the child without very much further trouble Some difficulty, however, was experienced in completing delivery of the body, as the child was very large, but healthy and vigorous, and exhibiting no mark of abrasion from the instruments Considerable hæmorrhage set in immediately after delivery, to check which a hypodermic injection of ergotin was given, but was not of any service The hand was then introduced into the uterus in order to extract the placenta, but, owing to the irregular contractions of the organ, this was accomplished with considerable difficulty The patient ultimately made a good recovery

The other confinements were perfectly natural and progressed satisfactorily

The death alluded to occurred in a child two months old, from pneumonia

The only case of zymotic disease among the foreign community was a mild case of measles in a young child, but many children in the adjacent villages were attacked with this affection The young native population in the vicinity of Chefoo have suffered somewhat also from an invasion of whooping-cough, illustrating the relation which exists between these affections, one disease sometimes preceding the other, sometimes following In this instance, as far as could be learnt, the whooping-cough preceded measles The mortality was not great Shortly after the subsidence of measles, many of the natives were attacked with inflammatory sore throat, attended with, in some instances, exudation of false membrane, thereby simulating true diphtheria, the temperature running as high as 103° or 104° Some of the families attacked lost two or three of its members, while others were more fortunate I did not meet with any case of paralysis or other sequelæ of diphtheria It will thus be seen that however healthy the season has proved to foreigners, the natives have suffered rather severely

NOTES ON SPRUE

By PATRICK MANSON, M D

THERE is a multitude of diseases peculiar to tropical and subtropical countries to which the inhabitants are liable, and which foreigners may acquire when exposed to the corresponding morbid causes. There is another class of diseases peculiar to these countries, attacking foreigners only, and but seldom, if ever, affecting the natives. Notably, tropical abscess of the liver belongs to this latter category. I might add also aneurism of the thoracic aorta, so alarmingly frequent in foreigners in this part of the eastern hemisphere, and so very rare among natives, and a third disease, which, so far as I can learn, has hitherto received little specific notice from medical writers, but which from its extreme fatality deserves the careful study and attention of everyone practising in these parts.

The disease I allude to is known in India and well known in Java, and in the latter country goes by the name of "sprue." Under this name I propose to offer a few remarks on the subject, more in the hope of eliciting further information from others than with any pretence of myself supplying an exhaustive description. The term "sprue" is sometimes applied to the ordinary thrush of infants, associated with the development of *oidium albicans* in the mouth, the disease I allude to has little in common with this affection. The one is a disease of infant life, the other is entirely confined to adults.

Several Indian writers whose works I have consulted appear not to have separated the disease from ordinary chronic diarrhoea. The best account I have met with is contained in the article "Diarrhoea," by Dr EDWARD GOODEVE, in the first volume of REYNOLDS'S *System of Medicine*. There it is described under the name of "chronic diarrhoea, white flux, cachectic diarrhoea," but even this writer does not appear to apprehend thoroughly that the disease he describes is one sui generis and distinctly separable from ordinary chronic diarrhoea.

Sprue may be defined as an extremely chronic and insidious disease peculiar to warm climates, the principal symptoms of which are referable, 1st, to a remitting inflammation of the mucous membrane of the mouth and alimentary canal generally, 2nd, to diarrhoea and irregular action of the bowels, and 3rd, to anæmia and general atrophy.

The symptoms referable to the inflammation of the mucous membrane of the mouth vary from time to time, but if we see the patient during one of the exacerbations, the tongue is found to be more or less swollen, its papillæ elevated and red, shallow ulcers have formed on various parts of the cheeks, tongue and lips, and saliva, rapidly accumulating under the tongue, pours out of the mouth while it is being examined. There is no fur on the tongue, it looks abnormally clean. But for the absence of fetor, one might suppose, from the salivation, the patient was under the influence of mercury.

The gums may be swollen, tender, and prone to bleed. When this condition is well developed, the sufferer speaks with pain and difficulty, saliva dribbles from his mouth, and

eating or drinking anything but the blandest of substances is an impossibility. The mildest wine burns like brandy. Salt, sugar, and spices, or sauces of any description, cannot be tolerated. The inflammation extending down the œsophagus makes swallowing painful, or, at least, the act is attended by a feeling of heat and rawness in the throat and under the sternum.

This, the acute stage, may continue for from two or three days to a week. It subsides, to recur with considerable regularity and more or less severity once or twice a month, or perhaps oftener. I have known cases in which the interval between the attacks was but a few days.

If during this interval the mouth is examined, nothing much amiss can be found with the buccal or labial or pharyngeal surfaces. The tongue, however, is seen to be very small and usually rather pointed when protruded. The surface appears as if entirely denuded of epithelium, with the membrana propria exposed and the papillæ shrunk. It is abnormally clean, and has a characteristic dry, glazed, shining look, as if it had been brushed over with a coating of fine varnish and allowed to dry. Under the tongue the mucous folds are prominent and bathed in a watery saliva. The edges of the organ are moister and more velvety than the centre and tip, and sometimes are traversed transversely by very shallow non-ulcerated fissures. The tongue keeps in this condition till the next exacerbation, and, though not so sensitive as when this occurs, is readily irritated and pained by spices or strong wine. Though common sensibility is very much exaggerated, it often happens that the sense of taste, and sometimes also the sense of smell, is altogether in abeyance.

Like the inflammation of the mouth, the diarrhoea is periodic. In some cases the stools become quite consistent for a time, but recurrence of diarrhoea before, during, or after the attacks of inflammation of the mouth is quite certain. At times the diarrhoea assumes a semi-choleeric character, the stools being profuse, watery, and very pale, and the enormous discharge of fluid may give rise to considerable collapse. Occasionally there is vomiting at the same time. Before these choleric attacks, which usually come on during the night, there is a feeling of intense languor, the abdomen is full and distended, and the patient is troubled with violent borborisms. Apart from the feeling of exhaustion, the patient is relieved by the diarrhoea, and the mouth and bowels gradually revert to their former condition. As a rule, the diarrhoea is not nearly so violent as I have just described, the stools being less frequent and not so copious. If the stools are inspected, they are seen to be pale, clayey, and frothy, as if fermenting, and often even during the interval between the acute attacks they retain this appearance, whether they are liquid, pulpy, or solid.

In some cases, the constant presence in the mouth of a large quantity of watery, insipid saliva gives rise to much distress, from the necessity it entails for continual swallowing or expectoration. The patient complains of a sensation as if produced by constant and excessive drinking of cold water. Another feeling is also often much complained of. The belly feels painfully empty, the sensation being as if the diaphragm and abdominal walls were sinking in. In such cases the bodily languor and feebleness are extreme.

A notable feature in the history of sprue is the great wasting accompanying it, altogether out of proportion to the amount of diarrhoea. The victims have all a withered, shrunk and old appearance. Percussion over the liver shows that this organ partakes in the general atrophy, but in none of my cases have I been able to detect any sign of grave organic disease in this

viscus The general atrophy of the tissues in some instances seemed to me to be more marked in the muscles than in the subcutaneous fat

From the fact that the attacks of diarrhœa, and sometimes of vomiting and mouth inflammation, correspond in time or immediately follow each other, I opine that the mucous membrane of the stomach and bowels is in much the same condition as what we can see it to be in the mouth This opinion is supported by the occasional occurrence of a similar inflammation around and just inside the anus, as if the morbid action had spread down through the entire alimentary canal, and from the fact that the exacerbations of diarrhœa sometimes precede, sometimes follow, the exacerbations of the mouth affection, I conclude that the starting point of the inflammation may sometimes be in the bowels, sometimes in the stomach, and sometimes in the mouth

When the disease is of some standing, the patient is feeble, irritable, incapable of much mental effort, and anæmic Sometimes the anæmia is profound Not only do the conjunctivæ and lips appear pale, but the tip of the tongue when protruded may have a pale yellowish look, like a piece of cartilage

Sprue is exceedingly insidious in its onset, and very slow in its progress I have watched a case during several consecutive years This chronicity is exceedingly characteristic, the patient can seldom say exactly when his disease began, nor, if interrogated from time to time during its progress, can he say positively he is better or worse It is only when comparison is made between the condition and weight of the patient at dates widely apart that the gradual and sure progress of the disease can be appreciated

Such is a brief description of the principal symptoms of sprue The prognosis in a well-marked case must be grave indeed, unless the sufferer is speedily removed to a colder and more temperate climate Left out here, after one, two or three years of suffering, there can only be one termination According to my experience, so long as the patient remains under the conditions in which his disease was acquired, medicine and dieting, although they may do much to mitigate suffering, will not effect a cure

As to the cause of sprue, I think we must look for it in the general unsuitability of the European constitution to tropical climates This is vague enough, especially as we cannot formulate in exact scientific language what the physical conditions are in which this unsuitability lies It is just possible that some accident to the alimentary canal may act as the immediate and exciting cause, and determine the advent of sprue in those constitutionally prepared by the warm climate and other predisposing influences For, of five cases I have carefully watched since I recognised and separated this disease, two had been subjected some time before to operations on the rectum, one for fistula, the other for internal piles, a third had but shortly recovered from an attack of acute dysentery No such influence could be traced in the other two cases one of them was advanced in years, had an enlarged prostate and atheromatous vessels, the other, until the development of the disease, had enjoyed fairly good health One of the cases—that following the attack of dysentery—had at one time a small amount of albumen in his urine Age and prolonged residence in China have a marked influence as predisposing causes, for of these five cases I allude to, all of them were over 35 years of age, and all of them had been over 10 years in the East

With regard to the influence of personal habits, I can only say that of these five cases, two had at one time lived very freely, one freely, one was moderate in the use of stimulants, and the fifth, a female, was a staunch teetotaler. Nothing seems to have so powerful an influence in aggravating the disease, and therefore, probably, in inducing it, as long-continued high temperature. From what I gather from friends who have resided in Manila and the Straits, I conclude that in these places the course of sprue is more rapid and steady than in Amoy. Probably the perpetual summer of these countries is the cause of this, and the short winter we enjoy may serve to modify, for a time at least, the onward progress of the disease. If this is the case, Shanghai and the northern ports, if they produce the disease at all, produce a milder and still more chronic form. Patients certainly improve during the cold weather.

Considering the limited nature of the field for observation afforded by the foreign community in this port, sprue must be set down as a common disease. I have never recognised it in a native. It seems to me that of late years it is more frequent than formerly, but this is possibly owing to faulty observation on my part, and my not having learned earlier to separate it from other forms of dyspepsia and diarrhoea. Now, whenever I meet a case among my own patients, or am consulted by a passer through, if I get a history of sore mouth, irregular bowels, and wasting unconnected with any decided visceral disease, I diagnose sprue.

In my attempts at cure I have tried many drugs. They have one and all disappointed me, and I have come to the conclusion that there is only one remedy for sprue, and that, to be effective, should be tried early in the disease. The patient should, as soon as possible, leave the country, and return to Europe, or seek a colder climate than China affords during the summer. This is emphatically the best, if not the only, remedy for sprue. When a patient comes with the symptoms I have described, his disease should be diagnosed as sprue, and the proper treatment—to leave the country at once—insisted on. Sprue and a temperate climate should be as thoroughly associated in the physician's mind, and in that of the public, as disease and appropriate cure, as are ague and quinine. But it is one thing to prescribe the remedy, another to get the patient to adopt it. So slow is the progress of this disease, so little urgent or alarming the symptoms, so frequent the temporary improvements, that it is seldom indeed we can move the patient to break the programme of life he has sketched for himself, or that stern necessity has entailed on him, and anticipate by a few years the furlough we all look forward to and promise ourselves. It is usually not until our prognosis has become his experience that he will consent to leave. Often then it is too late. I have twice lost patients in this way. They consented to go home only when they were worn to shadows, and then feet had become œdematous. They died on the journey before reaching Europe.

I think much good may be done by associating a disease like this with a name, for when a patient is told he has chronic diarrhoea, sore mouth, or stomatitis, he may, and generally does, until it is too late, make light of his complaint. But if in time the public learns that "sprue" is a deadly disease, and associates the disease with the absolute necessity for leaving the country, we physicians may have less difficulty in getting our recommendations carried out. It is this consideration that has in great measure influenced me to record these crude observations, and to attach to them a name. That I am not singular in giving so grave a prognosis to the unchecked disease, the following extract from a letter from Dr ROWELL, Principal Colonial Medical Officer at

Singapore, will testify I wrote to this gentleman on the subject, the following is an extract from his reply —

About the chief subject of your letter, the disease you allude to is not a common one with us. It is very common, however, in Batavia, goes by the name of sprue, and is exceedingly fatal. Tedious and chronic in character, it is marked by the absence of any definite symptom.

A sore tongue, and slight diarrhoea, with altered stools, which are generally clayey and frothy. Beyond these and progressive emaciation there is little else. I have had many cases under my cure, those have lived whom I was lucky enough to send away soon to England, but the majority have died, months even after having arrived at home. I think (this is my experience, however,) it is generally associated with a cirrhotic liver, or diseased liver of some kind. ——— passed through here a few months ago with it, from Java, and his friends thought there was nothing the matter with him. He died all the same of it after reaching Holland. There is no cure for it except an early departure for England. The difficulty I have found is to get patients to believe there is anything the matter with them, and they go on from day to day, and put off their leaving till it is too late. It always begins with a sore mouth (aphthous stomatitis), and as the disease progresses, it extends down the alimentary canal, and we have a sort of subacute enteritis with follicular inflammation.

I know of no book where a description of it as one sees it here is given.

These few words of Dr ROWELL give a graphic picture of the disease, and the trouble the physician has to encounter in getting his patient to save his life.

As palliatives, I find bismuth and stychnia during the remissions, and bismuth and morphia during the exacerbations, of some service. Of course, careful regulation of diet is indispensable. The ordinary astringents are injurious. Bael fruit extract I have frequently tried, but cannot report favourably on its action. It might be otherwise could we procure the fresh fruit so strongly recommended by Sir JOSEPH FAYRER and other Indian writers. Wine and stimulants generally should be given much diluted. Smoking and spirits should be interdicted. Dr ROWELL writes me on the subject of treatment —

The remedies I have found to answer best are a dose of grey, soda, and rhubarb at bedtime, two or three times a week, and through the day, chloride of ammonium and ipecacuanha wine in a vegetable tonic infusion. Turpentine with an alkali sometimes answers, iodide of potassium I have heard is of great benefit sometimes, but I cannot speak of its efficacy from personal experience.

He, too, has found that strong astringents do harm.

I would commend the following extract from Dr ROWELL's letter to anyone anxious to experiment with the drug it refers to —

A lady patient of mine, after being two years a sufferer, and reduced to a skeleton, gave me up and cured herself unquestionably with a teaspoonful of oil of amygdal, night and morning, expressed from the almonds as the fruit is sold in the bazaars. I had to give up practice then, having become Principal Colonial Medical Officer, so had no further chance of trying it on other patients, but I have no doubt it was the means of curing her. That is four years ago, and she is as well as possible now.

I hope these few remarks may do some good in directing the attention of others to a much neglected but very important disease.

BERIBERI, OR THE "KAKKÉ" OF JAPAN

By DUANE B SIMMONS, M D, -

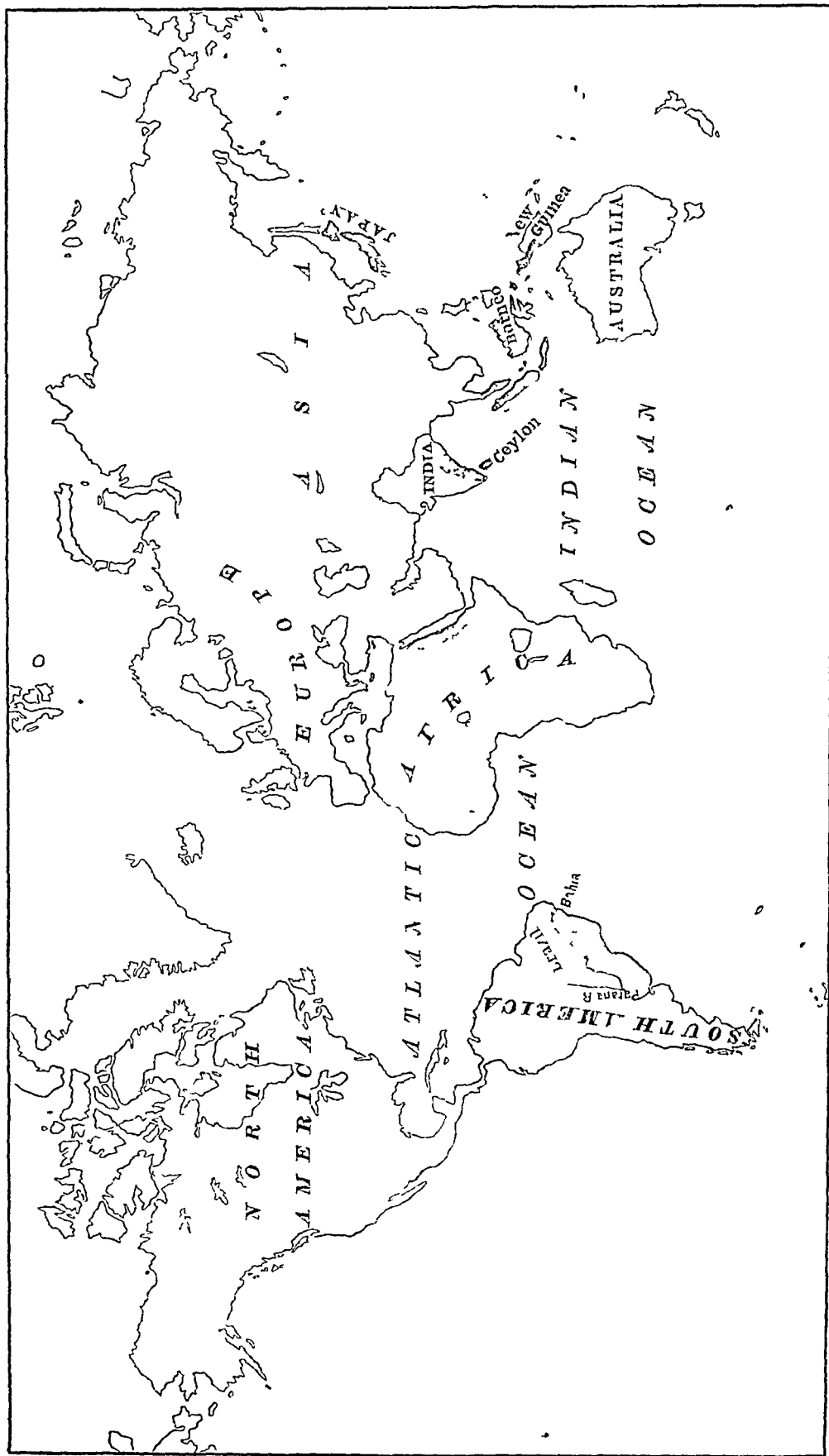
Eight years Director and Physician and Surgeon in Chief to Iwazen-in (the Prefecture or Government Hospital), and Consulting Surgeon to the Police and Prison Hospitals of Yokohama, late Sanitary Adviser and Member of the (Special) Health Board of the Prefecture of Kanagawa, and President of the Foreign Health Board of Yokohama

THE following contribution to our knowledge of a disease which is, as far as is yet known, limited in its prevalence to quarters of the globe beyond the so-called "pale of civilization," and consequently of no especial interest to any but students of geographical medicine, may at the first glance be regarded as quite uncalled for. So it might possibly have been 20 years ago. In this brief period, however, the navigation of the ocean by means of steam has so completely changed the old meaning of distance that this term no longer applies to any portions of the globe, however remote from each other. The countries of the once Far East are America's nearest western neighbours, and the island continents of the southern hemisphere are but a few days' sail from Europe. Western enterprise has thus come to plant its representatives in almost every quarter of the habitable globe, and medical men from the schools of Europe and America form a part of each and every one of these pioneer advances. Thus it is that Yokohama—a single seaport of a country but yesterday opened to the civilized world—numbers 14 western medical men among its inhabitants, and the other large cities or communities proportionally as many more.

DEFINITION OF BERIBERI

A disease occurring during the summer months, especially in the seaport towns on the eastern and southern coasts of the Japanese islands, chronic as to form, but subject to exacerbations of varying degrees of severity, having for its characteristic symptoms anæsthesia of the skin, hyperæsthesia and paralysis of the muscles, anasarca, palpitation, cardiac and arterial murmurs (in the wet form), præcordial oppression, abdominal pulsation, and for its cause a miasmatic or specific soil exhalation.

It has two distinct forms, the wet (beriberi hydrops) and the dry (beriberi atrophica). Cases of both are met in the same locality, the former more frequently when the summers are attended by an unusual amount of rainfall and moisture, and the latter when the season is of unusual dryness. The wet form is by far most to be dreaded, as it frequently runs a rapidly fatal course in defiance of all known modes of treatment. The dry form is rarely fatal.



SKETCH MAP INDICATING THE GEOGRAPHICAL DISTRIBUTION OF BERIBERI

NOMENCLATURE AND SYNONYMS

The name "beriberi" was first applied to the disease presenting the above symptoms by the Malabar physicians, and signifies that waddling, uncertain motion observed in sheep when walking—JOHNSON

Béribéri, de *ber*, mot cingalais qui signifie faiblesse, et répété grande faiblesse, maladie particulière au Malabar et à l'île de Ceylan—NISTEN

Hydrops asthmaticus—ROGERS

Synclonus beriberia—MASON GOOD

Bad sickness of Ceylon—TANNER

Morbus innominatus—SILVA LIMA

Kakké, signifying a heavy or tired feeling in the legs—Native physicians of Japan

It is unfortunate that the name kakké has been used by all the foreign physicians who have published any theory on the disease as observed in this country, as it is likely to lead to confusion by implying that it is a distinct malady, whereas its identity with beriberi has never been really disputed by anyone but Dr HOFFMAN, who evidently was not acquainted with the literature of the Indian beriberi

Barbiers, though regarded by a number of writers on Indian diseases as distinct from beriberi, is beyond question only a form of it, or what I call dry beriberi

HISTORICAL ACCOUNT AND GEOGRAPHICAL DISTRIBUTION OF BERIBERI

In the early history of the study of this disease great obscurity existed as to its nature. It was for a long time confounded with a variety of other affections, such as paralysis of various kinds, reflex paraplegia, dropsy, anasarca, cachexia, scurvy, and anæmic rheumatism, with various diseases of the heart and pericardium (AITKEN). The Anglo-Indian physicians of the Malabar coast and Ceylon were no doubt the first to suspect its specific nature, as is shown by a number of writers on the diseases of those countries. For a long time it was supposed to have a peculiar territorial range of limitation to the province lying on the Indian shore of the Bay of Bengal, between 18° and 20° north latitude, and to the island of Ceylon.

As attention became more generally directed to the subject, however, it was found to have a much wider range, embracing not only other islands of the Indian archipelago, but Java, Sumatra, Borneo, New Guinea, Banka, Celebes, the Moluccas, and the countries bordering on the Red Sea. In 1866, Dr J. F. DA SILVA LIMA, of Bahia, Brazil, published in the *Medical Gazette* of that place a series of observations on a disease which he called morbus innominatus, and which appears, in his essay since issued on the subject, to have been beriberi, and in 1870 I was the first to recognize its existence in this country. The comparatively late discovery of beriberi in the last two geographical localities, so widely separated and remote from its heretofore supposed limits of prevalence, is by no means proof or evidence that it had not previously existed in them. This fact is indeed established beyond question by fairly accurate descriptions found of the disease in some of the older medical books of this country, and though I am not in possession of the same facts respecting the prevalence of the disease in Brazil previous to the report of

Dr SILVA LIMA, I think it more than probable that such was the case there. The discovery of a disease in countries where medical science had previously assumed no definite shape may mean, therefore, only its recognition and description for the first time by competent observers. Such was certainly the case in this empire, for though, as I have said, the disease had undoubtedly existed here for a long time, the fact was not known to western medical men until after the recent opening of the country. It is curious that as yet there is no certain knowledge of the existence of beriberi in China, lying as that empire does between two geographical seats of its prevalence, with its hundreds of miles of sea-coast dotted with innumerable low-lying, crowded and dirty towns—conditions especially favourable to its production both here and in India. It appears almost too much to suppose that this want of knowledge of its existence there means exemption from it*. Let us presume that no favourable opportunities have existed for its observation by Europeans, for although China has been nominally open to foreigners for a long time, I believe that the diseases affecting the mass of the people are but imperfectly understood. Even in Japan, where everything foreign or western is welcomed, especially medicine (by no means the case in China), I had resided six years in a town of its endemic prevalence before my attention was called to its existence, though often solicited by the native doctors in consultation for nearly every form of disease. On inquiring of them later as to their reason for never asking my advice for this disease, they informed me that they thought it a malady peculiar to the country, and therefore concluded that I should know nothing about it. It is an important fact that no allied disease exists on the European side of the Mediterranean, or in Northern America. Even its presence in its old Indian haunts appears to be much less than formerly, as I am informed by Dr T. J. TURNER, late fleet surgeon, United States navy, Asiatic station, who made especial inquiries in regard to it. In fact, he was told that he could learn more of the disease in Japan than in India. This stands in strong contrast to the accounts of its ravages some years ago in that country, where, according to WARING, it was at one time the most fatal disease, next to cholera, to which Europeans were liable, while among the native convicts in the Indian gaols the mortality reached 36.5 per cent. Several epidemics, however, as late as 1863, are reported to have occurred on board French transports conveying coolies from the Cochin-China coast to the colonies. During the recent Dutch expeditions against the Acheenese, the disease is also said to have appeared among the troops. Dr SILVA LIMA states that in 1866 it raged with peculiar violence among the troops engaged in the Paraguayan war, in the direction of the back provinces of Mato Grosso†. Its absence from Europe and from the northern States of America is a somewhat remarkable fact, though no more so than the absence of yellow fever from eastern Africa and Asia.

LITERATURE OF BERIBERI

This, at the first glance, appears to be quite meagre, which arises from the fact that some of the popular works on the practice of medicine either make no mention of the disease at all or

* Dr ANDERSON, of Tokio, in his monograph on Kikkē, states that in a clinical medical work, written in 1321, and afterwards reprinted in Japan, a remarkably clear account of the symptoms of kikkē is given, and the author traces the complaint to the time of the Emperor HWAŪGTI (2697 B.C.).

† Since writing the above, I see by a note in the *New York Medical Record* that beriberi has reappeared in Brazil, in so severe a form that a commission has been appointed by the government of that empire for its investigation.

give it only passing notice. The reason for this is no doubt because of its generally supposed limited geographical range, and hence the inutilty of occupying valuable space with the description of a malady which neither authors nor readers have had, or in all probability will have, an opportunity of seeing. AITKEN'S *Science and Practice of Medicine*, however, being intended to meet the wants of English physicians abroad and at home, is an exception to this rule, and contains a very good description of the disease. The authors whom he quotes are evidently those whose contributions to the subject were made in the form of monographs, army medical reports, and journalistic articles. Among these writers are HAMILTON, CHRISTIE, WARING, MALCOMSON, HUNTER, EVEZARD, FARRELL, DICK and RIDLEY. COPLAND'S *Dictionary of Practical Medicine* also, and *Le Dictionnaire de Médecine et de Chirurgie*, contain very good descriptions of the disease. The article on Beriberi in JOHNSON'S *Influences of Tropical Climates* is by Mr J RIDLEY, and was taken from the *Dublin Hospital Reports*. A short essay by Dr DAMMANN, and a somewhat lengthy one by Dr L F PRAEGER in the *Annales de Médecine navale néerlandaise*, 1870, are before me. The literature of the disease in Brazil is, as far as I am aware, confined to the writings of J F DA SILVA LIMA in the *Medical Gazette of Bahia*, and an essay in Spanish, a review of which is contained in the *Edinburgh Medical Journal* for March 1873.

The literature of the Japanese disease by foreign physicians is limited to a paper read before the German Asiatic Society by Dr HOFFMAN, one by Dr WERNICH, in a German periodical, and one by Dr WILLIAM ANDERSON, in *Guy's Hospital Reports*, which has since appeared in pamphlet form. A number of Japanese physicians have written on the disease, under the name of kakké. The earliest description of it was by OSADA TOKUHOU, in 1562, next by TACHIBANA NANKÉ, in 1715, and the third by KATÔ SEIIO, at the end of the last century. Their speculations and conclusions, therefore, though curious, are hardly worthy of a place in a scientific journal.

I first recognised and commenced the systematic study of beriberi in 1870, since which time I have seen and treated a large number of cases, not only in the Government Hospital of which I have charge, but in a considerable private and consulting native practice in both Yokohama and Tokio, the capital. Though the first foreigner to observe this disease in this country, I have been anticipated in publishing an account of it, hoping to obtain in the meantime additional data and information upon which to base my opinions and conclusions.*

* A kakké or beriberi hospital was established in Tokio by the government in 1878, having for its object (a) the scientific investigation of the disease, (b) a comparative trial of the value of the foreign and Chinese systems of medicine in its treatment. The institution is divided into equal parts for this purpose, and leading men representing the two systems having been placed in charge of them, the peculiar experiment is watched with no small degree of interest by the advocates of the two schools. I understand that the Educational Department, which officially recognises only the foreign system of medicine, yielded a reluctant compliance to this competitive plan, which was favoured by the Emperor, who still retains a certain amount of faith in the medical doctrines of his ancestors. Evidently that the trial might be a fair one as between Japanese, His Majesty requested that no foreigner should be employed or take any part in it. The result, so far as appears in two reports of the institution which have been issued, is much to the discomfiture of the disciples of the Chinese system. The representatives of the foreign school engaged in the work are men who have received their medical education in Europe, and some good results may be looked for from their studies. As yet they have confined themselves mostly to statistical work. Some half dozen postmortems have been made by them, the results of which have not yet appeared.

ETIOLOGY

WAGNER says that etiology, or the knowledge of the causes of disease, is one of the weakest chapters in pathology. It is eminently so in regard to beriberi, as few of those writing on the subject more than hint at certain probable causes. My own investigations have led me to the almost definite conclusion that its exciting cause is a specific miasm or soil exhalation which, like paludal malaria, shows itself in more or less well-defined areas. An important rôle is played by a number of circumstances or conditions rendering particular individuals especially susceptible to the influence of the poison. In general terms, beriberi is a disease of the low-lying towns on the seaboard, though occasionally met with in the interior. Its period of endemic prevalence is the summer months, and it often becomes severer or epidemic in seasons of unusual rainfall. During the winter months no new cases occur, and the old ones mostly recover. Actual or old residents of the locality of its prevalence are much less liable to contract the disease than strangers (natives), and even in them a certain period for its development is required, hence the proportionally large number of soldiers, sailors, policemen and students—drawn mainly from the rural districts—who suffer from the disease. Debility and anæmia are not predisposing causes of the kakké of Japan, on the contrary, the best fed, best nourished, and best cared for are usually its most frequent subjects, while the weak and destitute, with all the attendant conditions of bad hygiene, are only exceptionally attacked by it. The old and young are almost entirely exempt from the malady, and women rarely suffer from it except during the puerperal state. One attack predisposes to others in succeeding years, if its subjects remain in the locality where the disease prevails, while removal, if the disease is not too far advanced, surely produces an amelioration of all the symptoms, and in most cases effects a cure, even without medical treatment.

AITKEN says, "The etiology of beriberi is but little known, Malaria, alternations of climate and temperature, noxious material in the waters of districts, have all been indicated as operative agents in bringing about the disease. But looking to the fact that all the phenomena of the disease point to anæmia, it may be generally stated that whatever tends to induce this state will favour the development of beriberi." Dr DAMMANN says of beriberi, "Autant d'auteurs, autant d'opinions diverses." It has been attributed to the continual rains which occur in India from the first days of November till the month of May, and the alternations of cold and heat to which the inhabitants of the country are exposed. According to others, beriberi is the consequence of insufficient or bad nourishment, which produces a dyscrasia of the blood, and though not identical with the dyscrasia of scurvy, has a strong resemblance to it. It has been ascribed to a progressive paralysis of the spinal cord, produced by malaria, or to the development of a rheumatismal paralysis. BLRNHARDT refers the cause of beriberi to atmospheric influences, and ranges the disease among rheumatismal affections. ROCHARD believes the cause to be found in the diet, especially rice. COPLAND, in his *Dictionary of Practical Medicine*, says, "Opinions respecting both the remote and proximate causes of the disease differ very materially among those who have had opportunities of observing it." He quotes the following, however, as the most trustworthy authorities on the subject, viz, Drs CHRISTIE and ROGERS, who regard beriberi as a consequence of deficient and poor diet, impure and moist air, or

prolonged exposure to marsh exhalations, and consequently a disease of debility—an opinion which is in general accordance with that of MESSIS DICK and RILEY

LE ROY DE MÉRICOURT says that among the numerous and often contradictory opinions advanced on the subject of the etiology of beriberi, "it is impossible to ignore the capital rôle which alimentation plays in the production of this disease" According to PRAEGER, the disease is only a variety of scurvy, as already stated by HELLEMANN in his academic thesis in 1857 On this subject PLOMB expresses himself of the same opinion PRAEGER also says miasm has no influence in the production of beriberi if alimentation is sufficient, he further observes that "Of all the explanations given of the nature of this disease, that which appears to be the more correct is that it is a rheumatismal paralysis, to which may always be added œdema" DR J F DA SILVA LIMA says, "Different observers in Brazil have suggested very various explanations for the outbreak of the disease in that country, all, however, attributing it to more or less local causes applicable to but a very limited number of cases, and therefore of a very secondary, if any importance at all Of any more general cause applicable to the disease in all its various manifestations, we are, and it is perhaps as well to confess it at once, entirely ignorant" HOFFMAN speaks of some general causes of the disease which appear as predisposing, but does not commit himself to any specific one ANDERSON, though not giving any definite cause in his first writings on the subject, concludes, in a more recently published monograph, that an atmospheric poison of local origin is the materies morbi

The native Japanese physicians believe that the cause of the disease is an emanation from the ground, thus explaining the first appearance of the malady in the legs

Though the authorities just quoted comprise some of the most reliable as well as latest writers on beriberi, or kakké, it is easy to see that none have added much, if anything, definite to our knowledge of the direct or immediate cause of the disease This question, therefore, equalling, if not exceeding, in importance any other in connexion with this affection, is to all intents and purposes still an open one Before criticising the views of others on this subject, I will present my own Though these may appear drawn out almost beyond the limits appropriate to a paper of this kind I do not hesitate to give them in full, as the subject demands much more than a passing notice

PREDISPOSING CAUSES

1 *Age*—A large majority of all cases of beriberi occur between the ages of 20 and 30 Confirmatory of this opinion, I find, in the report of the Beriberi Hospital in Tokio, the following "In 85 cases received in that institution in a given period, 1 was under 15 years, 14 between 15 and 20 years, 50 between 20 and 30 years, 11 between 30 and 40 years, and 9 between 40 and 60 years"

2 *Sex*—This is remarkable from the fact that comparatively few females suffer from beriberi, except during pregnancy and a short time after confinement It shows itself soon after the middle of gestation, in the wet form of the disease, and culminates at its completion In the dry form extreme muscular atrophy and paralysis often come on later DR STUART

ELDRIDGE informs me that in Hakodadi, while he had charge of the Government Hospital there, kakké was very prevalent and fatal among pregnant women

3 *Occupation and Social Condition*—Those of sedentary employments are most subject to the disease. Coolies and common labourers, jiniiksha men (drawers of small chairs or carriages), of whom there are great numbers in the country, bettoes (footboys, or men who run along with the horses as attendants), and farmers rarely suffer from it. Sailors of all classes, especially those on board men-of-war and small coasting junks, show a marked susceptibility to the malady. This is especially observed in the latter when, coming from a distance, they are obliged, while the vessel is receiving or discharging cargo, to remain some time in a port where the disease is prevailing. I have seen not unfrequently a whole crew of half-a-dozen or more men, showing no signs of beriberi on arrival at Yokohama, suffer more or less severely from it a short time afterwards. In these cases the disease was contracted after arriving in port, and after a free supply of fresh provisions had been obtained. The theory that beriberi is a form of scurvy would seem to be weakened, if not wholly disproved, by this fact. Dr ANDERSON gives a striking example of the susceptibility of sailors to beriberi in the case of a Japanese man-of-war lying at Yokosuka, the naval dockyard. Out of 300 seamen, about 70 were attacked with it, of which number 20 died in a very short time, and 47 were sent to the Naval Hospital in Tokio for treatment. On inquiry, the food, clothing and exercise of the sailors were found satisfactory, but nearly the whole crew slept during the night in a space allowing but 32 cubic feet per man, while, owing to the sheltered anchorage of the ship, the air was almost stagnant. After a medical investigation, the sleeping apartments were at once altered by the Admiralty, and, as a result, the epidemic almost entirely ceased. This Dr ANDERSON puts forward as an argument in favour of bad air, etc., being not only predisposing but also exciting causes of the disease, while I hold that they are the former only.

Two points are here to be noticed, the bearing of which will be seen further on. 1st, Yokosuka is a port of especial prevalence of the disease, having two or three times suffered from it in epidemic form, 2nd, the sailors were not residents of the place, and were therefore unacclimatised, further, from the harbour being a small one, they were exposed to the exciting causes of the disease, even if they remained constantly on board, which is not to be supposed—in which case the dampness and foul air of their quarters may still have been only predisposing causes. The same may be said of the junk sailors already referred to.

An equal, if not greater, susceptibility to the disease is shown by soldiers, policemen, students, merchants, and clerks from the country*. Other things being alike, those occupying the better social positions in life, the well-to-do generally, show a greater susceptibility to the disease poison than those of the opposite scale. It is remarkable also that not only those who are well provided for, but those also having the general appearance of health and vigour, as shown by firm and well-developed muscular systems, are among those in this country who usually suffer from it. So marked is this in my experience that I am disposed to place it here among the predisposing causes of the disease, notwithstanding the strongly expressed opinions

* In 98 cases received in the Tokio Beriberi Hospital, there were 39 students, 18 soldiers, 14 merchants, and 27 of other occupations.

already quoted to the contrary. Those, on the other hand, of naturally weak constitutions, or who are suffering from chronic diseases, rarely become its victims in any form. As a sequence or complication, however, of acute diseases, such as miasmatic and continued fevers, and also of syphilis, it is not uncommon. Though beriberi in India is peculiarly severe in gaols, it is quite rare in such institutions in this country, unless they are within the limits of its prevalence, even if so, their inmates are not especially liable to the disease. Here, however, the prisons are mere stout wooden cages, and, if possible, too well ventilated for comfort, while in India they are of stone, poorly ventilated, and said to be damp—moisture being, in my opinion, a powerful predisposing cause.

4 *Diet*—Though this is so strongly urged by most Indian writers on beriberi as a predisposing cause of great potency, or even an exciting one—especially if the food is bad or insufficient,—in this country, according to my experience, it is of doubtful importance. Indeed, as I have said, those who are in a condition able to afford good and abundant food are most liable to beriberi. I must admit, however, that rice of the better quality is badly borne by those suffering from this disease, while at the same time it is the chief food of those most liable to it. A change, too, from this to a coarser food, such as barley and beans, is a measure of great importance in the treatment of the disease. In what the difference consists, unless the latter articles are more laxative than rice, or contain more potash (rice being poor in this respect), I am unable to state.

5 *Relapse of the Disease*—A primary attack of beriberi renders its subject for years afterwards most markedly susceptible to it, and for several successive summers he is pretty certain to suffer with it in a greater or less degree, so long as he remains in the same or similarly infected locality, though all symptoms usually disappear during the intervening winters.

6 *Non-acclimatisation*—Though the power to resist certain diseases, acquired by an early or prolonged residence in the locality of their especial prevalence, is but little understood, yet certain facts bearing on this point have been so clearly established in the course of my investigations of beriberi, that I am led to consider it a factor of great importance. The converse, or the diminished resistance shown by strangers (Japanese) is still more striking, because more easily demonstrated in the proportionally large number of transient residents (native) of the affected localities, such as Yokohama, who suffer with the disease. This explains several important facts already mentioned, viz, 1st, the especial prevalence of beriberi among soldiers, policemen and students, who are drawn from the rural districts, and stationed in the large seaport towns where the disease is endemic, 2nd, its greatly increased and often epidemic appearance in these towns after the congregation in them of the above mentioned classes, following certain political changes.

7 *Race*—It is not without some hesitation that I indicate this as a possible predisposing cause. The following are the facts bearing on this point. Foreigners, or natives of Europe and America, in Japan enjoy nearly absolute exemption from beriberi. Out of a population of about 2,000 foreigners in Yokohama, a district of especial prevalence of the disease, not a single well-authenticated case has been met with. On the other hand, WARING says of the disease, "Next to cholera, beriberi must be regarded as the most fatal disease to which

Europeans in India are liable" PRAEGER mentions, however, that European residents in (Dutch) India are only exceptionally attacked by beriberi

8 *Season and Temperature Changes*—Not only do very few primary cases occur before March and April, or after October, but the vast majority of those attacked, except when the acute disease is followed by extreme muscular degeneration and atrophy of the extremities, recover more or less completely during the intermediate or winter months*. The influence of an elevated thermometric range is therefore evident. Still more unfavourable conditions are cold and wet summers in which changes are sudden. It is then especially that the wet form of the disease shows itself either sporadically or epidemically, among the transient residents of all the localities furnishing the elements of its production. With a sudden fall of temperature after a few hot days, accompanied by rain, I have often been able, when having a number of beriberi cases under treatment, to predict an exaggeration of all their symptoms, and foretell an increase in the number of cases in the outdoor service. I have thus come to regard beriberi as an exceedingly treacherous disease, having seen many cases up and about with comparative comfort on one day suffer the most terrible agonies of oppression and suffocation the next, to be relieved only by death, without any other apparent cause than a sudden fall of a few degrees of the thermometer, with a drizzly wet night. Local sources of dampness, such as the forecables of ships, the hold, and passenger accommodation of transports, are strong predisposing causes. The history of marsh miasm, it is well known, furnishes similar examples. This no doubt accounts for the outbreaks of beriberi on board the French ships in 1852, when 20,000 Indian emigrants were taken to the Coromandel coast (ROCHARD). I have observed that the inmates of stone buildings, even in good localities, are especially subject to beriberi, a circumstance which explains its being called a gaol disease in India. Another explanation for the outbreak of the disease on shipboard at sea may be found in the water used for drinking, which, being procured from the shore, may be the vehicle of the poison.

EXCITING CAUSES

All my investigations of the exciting causes of beriberi go to justify the conclusion that it is a specific miasm or ground exhalation. I was led to study this source of the materies morbi by the striking resemblance which exists between the circumstances and conditions which appear to give rise to it and to marsh malarial affections generally. This will be readily seen by the following comparative table—

MARSH MALARIAL DISEASE	BERIBERI
1 Endemic or epidemic	1 Endemic or epidemic
2 Limited to well defined localities, and never spreading beyond them, except from more or less easily recognised causes	2 Limited to well defined localities, and not often observed to spread beyond them, except from well-understood causes

*The date of attack, or, more properly, of coming under treatment, definitely ascertained of 265 cases were as follows—January, 1, February, 1, March, 2, April, 5, May, 13, June, 39, July, 63, August, 80, September, 37, October, 24

3 The specific poison of the disease may remain latent for some time, and then suddenly appear when the subject is some distance from its source, usually the result of sudden changes of temperature	3 The same
4 The manifestations may be chronic, subacute, or pernicious	4 The same
5 Decidedly a disease of warm seasons, and usually disappearing with the approach of cold weather	5 The same
6 One attack no protection against another, but a strong predisposing cause to it	6 The same
7 Women less liable during pregnancy	7 Women more liable
8 A period of incubation often observed	8 The same
9 If exposure to the cause is prolonged, it is usually accompanied by organic lesions more or less decided	9 The same
10 Age and occupation <i>not</i> predisposing causes	10 Age and occupation strong predisposing causes
11 Non acclimatisation exerts a powerful influence over individual susceptibility to the disease	11 The same
12 No geographical limitation, but more prevalent in hot and temperate climates	12 A somewhat peculiar geographical limitation, as far as known
13 Sudden meteorological changes have a very decided influence on the production and progress of the disease	13 The same
14 Removal of the patient beyond the limit where the disease prevails exercises a powerful curative effect, even when other modes of treatment have failed	14 The same

In my investigations of this branch of the subject, I have carefully selected this particular area of prevalence (Yokohama), and venture to assume that one locality though small in extent, if studied carefully, will be of greater value in determining the correctness of the theories advanced than a mass of evidence compiled from the observations of others, or scattered over distant and wider fields, the lines will be sharp and well defined, and a few facts can then be determined having a direct bearing upon the points to be established. A long residence here enables me to give a description of the place before the town was built, as well as the topography at present—both having an important bearing on the exciting causes of beriberi. On my arrival

* I will here state, however, that, notwithstanding the above showing, I hold decided opinions as to the distinct nature of the two poisons, though believed by some authors, as already stated, to be identical.

here 19 years ago, four months after the opening of the country, I found a small fishing village stretching along the shore of a deep bay at the mouth of one of the numerous valleys, with high bluffs on either side, such as everywhere break the coast line of this sea-girt empire. Behind the somewhat elevated gravel belt occupied by the town, and stretching inland for three or four miles, were low rice fields on either side of a sluggish stream. As the town grew, these fields were filled in by soil from the bluffs, until, to-day, a city of over 50,000 inhabitants rests on this new-made land—in some parts below the sea level. This, in general terms, is the description of those localities where the disease is most prevalent. As may be easily seen, drainage is difficult, and the soil is saturated to within a few inches of the surface with blackish water. One of the results of this exposure of new earth, much of which was not immediately covered with houses, was the appearance of marsh malarial diseases, in severity and frequency before unknown. In a like manner, cases of beriberi began to appear. Their number remained proportionally small, however, for some years, but the disease took an epidemic form at the time when there was a large influx of soldiers, policemen and students. I am aware that those who hold the theory of bad drainage and crowding, as in schools and barracks, as the cause of beriberi, have here many of the required conditions in support of it. I am willing to admit these as possible predisposing causes, but take positive issue with the statement that they are the exciting causes of the malady.

As to its local characters in Yokohama, I have had abundant opportunities for observation. Thus, cases are frequently met with on the side of the surrounding bluff overlooking the town, which has unexceptionable drainage, and buildings well ventilated—as, for instance, this hospital and the Normal School, yet beyond, and on the other side of the same bluff, there are none. This is accounted for by the lifting of the miasm from the lower town, and its carriage to the bluff and buildings thereon by the south-westerly winds, which are the prevailing ones in the summer. The following fact goes still farther in proving the strictly local character of the exciting cause of beriberi. Yokohama being the capital of this province, criminals are all brought here for trial. During their examination, some are kept in a gaol in the town, after which they are transferred to the prison proper to serve the terms of their sentences. The prison is situated just beyond the limits of the town and on the *other side of the bluffs* surrounding it. Here also the situation is low and the drainage bad, while 500 or 600 convicts occupy cells containing 70 or 100 each. Occasional cases of primary beriberi occur in the gaol in town, but none ever occur in the prison on the *other side* of the bluffs. The sanitary condition of this prison compares very badly with that of the Normal School, which contains from 60 to 70 students, all occupying good-sized dormitories, yet 50 per cent of all the students in this school suffered more or less from the disease during the summer of 1878, and likewise not a few in the Ken Hospital—close by the school,—who entered with other diseases. Acclimatisation cannot be urged in the case of the prisoners as the cause of their exemption, as at least 50 per cent of them are from the country, as are the students. The fact is that the prison is located *beyond* the limit of the prevalence of the specific poison, and the school and hospital are within it, while the respective localities of prevalence and non-prevalence are separated from each other by a few hundred yards only of high land. The disease, as I have said, exists mainly in the seaport towns on the eastern and southern

coasts of the islands comprising the empire, more particularly those situated on new-made land. Exceptions exist, however, to this—the city of Kioto, well situated, with a fine water supply, a number of leagues from the sea, suffers somewhat from the disease. The same may be said of some other places in the interior, and of a few seaport towns on the north and north-west coasts.

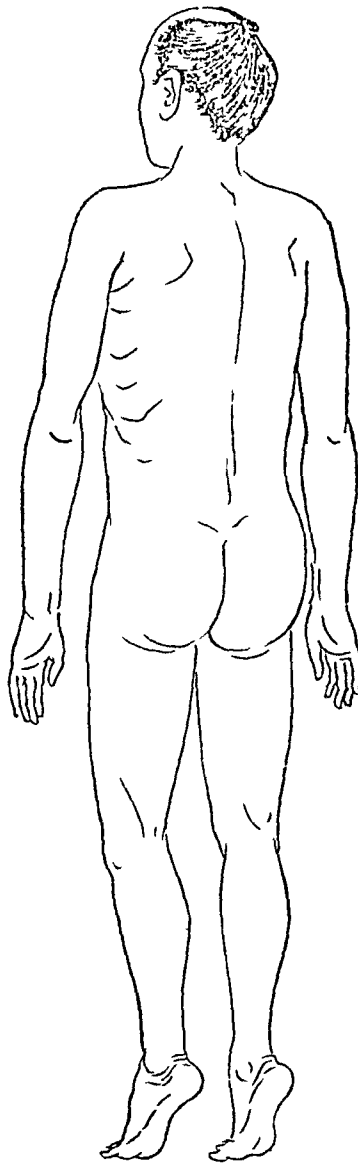
With regard to malarial miasm, it is generally admitted that heat, moisture, and vegetable decomposition are indispensable factors, and yet, who would assert that malarial disease does not occur in elevated localities possessing a dry, barren soil, or during the winter months? These apparent exceptions are with difficulty reconciled with the usual views entertained as to the origin of the disease, but nevertheless do not shake the faith of medical men in the theory. I have long entertained the idea, however, that heat, moisture, and vegetable decomposition, as causes of malarial miasm, are only predisposing, the miasm itself being some unknown factor for the development of which these predisposing causes act, as similar conditions bring forth in due course the various phenomena of vegetable life. It is this view that I take of the origin of the specific poison which gives rise to beriberi. The almost simultaneous appearance of malarial disease and beriberi, consequent on the same conditions in this place, together with the striking similarity between them, would suggest a common cause, but a close scrutiny of the course of the disease, and the utter uselessness of quinine forbids this conclusion. Another argument in favour of its local origin is its great prevalence among those who come from beyond its limits to reside within them. This has been established by what was said under the head of non-acclimatisation, and still more conclusive evidence is afforded by the rapidity and almost certainty with which sufferers find relief, or recover entirely, on being removed beyond the area of its production, and the equal rapidity and certainty with which all the symptoms of the malady re-appear if a patient returns too soon, or at all, to the same or similarly infected localities. The following case well illustrates this—

The hospital apothecary presented himself on 10th August 1878, with the usual symptoms of *kakké* in considerable severity, having suffered from its slightest manifestations for some days. He was advised to go at once to the mountains, about 30 miles distant. Being furnished with the disease, he was able to give a clear account of himself. On his way he stopped at the house of a friend, about four miles from the hospital, and in three or four days began to feel better, the sense of suffocation and palpitation, from which he suffered on leaving, gradually lessened, and he was no longer inconvenienced. On the 25th of August, 15 days afterwards, he reported himself fit for duty, presenting no symptoms of the disease to an ordinary observer. Scarcely 48 hours had elapsed, however, before some of the old symptoms began to be experienced, and they increased until he was severely ill again. On 31st September, eight days after his return, he was again sent to the country—with some difficulty, however, due to decided paralysis of the lower extremities, which symptom was less marked on the first occasion. By degrees the symptoms all subsided, and upon 1st October, 27 days after leaving the hospital, he, for the second time, reported himself fit for duty. He was somewhat weaker than on his first return, and although no decided exacerbation or relapse again occurred, he did not make any further progress toward recovery until later in the season, when those suffering from the disease generally recover. No medicine except an occasional cathartic was given.

I have recorded a number of cases presenting the same general features of rapid recovery and quick relapse respectively, following a removal to the country and a return to

the infected locality Not only do all medical men, both native and foreign, now urge their kakké patients to go to the mountains as soon as the symptoms appear, but the army and navy departments send large numbers nearly every season to the mountains from their respective hospitals, as the best and surest means of treatment In 1877, so many students in one department (Marine paymasters) in Tokio were ill with the disease, that it was transferred *en masse* to a temple four or five miles from the city, where the session was continued, those sick recovered, and no more cases developed Following my instructions, the Police Department of Yokohama has selected a temple a short distance beyond the limits of the town as a sanitarium, to which the members of the force are transferred from the General Hospital when the number and severity of the cases warrant it In 1878, the beneficial effects of this plan were shown in a striking manner, suddenly, as is not rare, a number of subacute cases—those most common—took on a pernicious form, and a large number of new cases appeared both at the Police Hospital and in my own Within 36 hours, three men in the former and one in the latter had died Twenty cases were immediately transferred to the Temple Hospital without the city limits, belonging to the Police Department, with the most satisfactory results, no more deaths occurring from the uncomplicated disease It is worthy of note that the Police Hospital (in the city) is beautifully situated, half-way up the bluff, but on the town side, on a plateau overlooking the town The space it occupies is ample and well drained, while the wards are well ventilated and not overcrowded, equalling in every respect the Temple Hospital retreat, except that the latter is out of town, in a locality notoriously free from beriberi miasm

However produced, beriberi is distinctly a specific disease According to the testimony of Indian observers, the condition is one of anæmia That they should have been imbued with this idea is not to be wondered at when we consider the fact that the races of those regions show a greater disposition to blood poverty and cachexia than those of the temperate zones But inasmuch as the causes of anæmia when affecting a large number of persons, are generally the same, viz, bad and insufficient food, impure air, and malarial exhalations, why do we not see, in some degree, the characteristic symptoms of beriberi wherever these conditions exist? When we find the disease showing itself in a race like the Japanese, among whom absolute or relative poverty of the blood, though more common than among beef-eating people, is by no means the rule, the question whether the disease is not rather the cause of the anæmia—when present,—is naturally suggested We have two prominent facts 1st, that in this country the well housed and well fed generally suffer most, 2nd, that in the incipient stage, paleness of the mucous membranes, and other symptoms of anæmia are greatly the exception It was with preconceived notions of the anæmic nature of the disease that all the foreign medical men who were first called upon to treat kakké wasted precious time in giving them first cases preparations of iron, and the routine treatment for anæmia, with the result of losing most of them, while the Japanese doctors (rude empiricists) saved most of their cases by the opposite plan of rapid depletion and evacuation of the enormous collections of serous fluid, by the use of hydragogue cathartics Even in those cases where the native mode of treatment appeared less urgently indicated, iron, quinine and tonics proved of little value



POSITION SOMETIMES ASSUMED IN WALKING AFTER PARTIAL RECOVERY FROM BRIBLERIA
ATROPHIA—DUE TO SHORTENING OF CALF MUSCLES

CLINICAL HISTORY OF BERIBERI

There are two forms of the disease, viz —

1st *Beriberia hydrops* (wet beriberi), in which there is a hydæmic condition of the blood, and distension of the areolar tissue generally with serum, giving the body a bloated appearance

2nd *Beriberia atrophica* (dry, or atrophic beriberi), in which there is a notable deficiency of fluid in the vessels and in the areolar tissue, and early atrophy of the muscles

These two forms of beriberi were regarded by the early Indian writers as distinct forms of the disease, the latter receiving the name of *barbieis*

In general terms, beriberi may be divided into four stages—prodromic, subacute, acute or pernicious, and chronic. From the very insidious nature of its approach, sometimes extending over a period of several weeks, it is often difficult or impossible to determine the exact time of invasion. It is generally admitted that a residence of some weeks in an infected locality is necessary before any decided symptoms make their appearance. Being a disease essentially of warm seasons, the length of this incubation depends on the particular months during which exposure occurs. As in many other diseases of slow development, the symptoms of the prodromic stage are certain not easily defined feelings of indisposition, as an occasional sense of chilliness, inaptitude for mental exertion, and especially a tired feeling in the lower extremities. A peculiar feature of this stage is that it is not always steadily progressive, but intermittent, with periods of from three to five days in which the patient may feel comparatively well. In exceptional cases only, in this climate, does the acute or pernicious form immediately succeed the prodromic stage. A period of uncertain length intervenes, during which the characteristic symptoms appear and constitute the subacute stage. The first symptom is generally anæsthesia of the skin over the anterior tibial muscles, in the tips of the fingers, and around the mouth, in the order given. Paralysis in varying degrees next declares itself in certain groups of muscles, usually those immediately underlying the regions of anæsthesia. As a consequence, there is dropping of the toes, causing the patient while walking to lift the feet high so as to clear the ground, giving rise to the peculiar gait noted by many observers as characteristic of the disease. A sense of constriction in the muscles of the calves is usually experienced at the same time, arising from a veritable contraction which causes their enlargement and hardness, with tension of the tendo Achillis, increasing the difficulty of lifting the toes. A feeling of tightness in the chest usually accompanies this condition, due, no doubt, to some degree of paralysis of the muscles of respiration. If firm pressure now be made upon the muscles, more or less tenderness will be found to exist, especially noticeable in those groups occupying the posterior part of the leg, the inner sides of the thighs, back of the forearm, and the upper part of the chest, or it may be general, but less in degree. More or less heart palpitation is complained of by the patient on making any considerable exertion. Up to this point the symptoms are common to both forms of the disease, to them the characteristic feature of *beriberia hydrops* is now added, viz, *anasarca*. Its first manifestations are in an oedematous condition of the areolar tissue of the anterior part of the leg. That this is more or less general, even at an early stage of the affection, is evident from the plump appearance of the subject, and a certain sallow-white colour of the skin, especially

that of the face. In uncomplicated cases the temperature is normal, or a little below the normal point, there is likewise no increase in the frequency of the pulse. The quality of the pulse, however, is changed, and characteristic in both forms of the disease. Thus, in the wet form it is full, large, and easily compressible, showing a great diminution of arterial tone, while in the dry form there is an exactly opposite condition. If the heart be now examined, a decided systolic murmur will be heard most distinct over the pulmonary valves, the same being in most cases of wet beriberi found to exist in all the large arterial trunks. The heart gives evidence of varying degrees of dilatation and want of tone, such as increased area of dullness on percussion, intercostal pulsation, etc. In the dry form murmurs are either slight or wanting altogether, and the area of cardiac dullness is variable. These differences are not simply expressions of degrees of severity of the disease, as will be shown farther on. In both forms the appetite is little impaired in the earlier stages, but if the stomach be over-distended, there is an increase of præcordial oppression. There is sluggishness of the bowels in the wet form, and the urine is scanty, in the opposite form, there is but little deviation from the normal. In this country the vast majority of cases of either form of beriberi are *subacute*. The yearly appearance of the disease in the same individual, and its long duration, constitute the *chronic* form. From this it will be evident that the acute or pernicious stage or form of the disease is only an exaggeration of the subacute, as is observed in other affections, notably those of marsh malarial origin.

The term pernicious is, strictly speaking, applicable to the wet form of the disease only, the dry form being rarely fatal. A marked case of the wet form is always to be regarded as more or less dangerous, from the suddenness with which acute symptoms often declare themselves. In these the anasarca, which, as has been stated, constitutes the leading clinical difference between the two forms of the malady, plays an important rôle. It often happens that in the course of a few hours the local œdema in the extremities and the slight puffiness of the face become extreme, and the areolar tissue of the whole body is goaded with fluid. The cavities, especially the pleural and pericardial, suffer more or less distension with serum, thus mechanically embarrassing the action of the organs they contain. The action of the heart becomes laboured, the lungs œdematous and filled with coarse râles. A terrible sense of suffocation comes over the patient, causing him to seek relief by constant changes of position. The stomach becomes irritable, and vomiting of greenish-yellow fluid occurs, this being almost always prognostic of a speedily fatal termination. The acute stage in the dry form is characterised, on the contrary, by a rapid diminution of the fluids of the body, and an increase in the existing paralysis and muscular atrophy.

CASE I. *Pernicious Beriberi, Death, Autopsy*—S, æt 26, policeman. Parents not living, father died from some chronic disease, mother from dropsy. Has three brothers and one sister living. Has never had syphilis or rheumatism, and his general health up to the present time has always been good. Entered the hospital 15th June, with the following history—

During the first days of May, began to feel unwell, had occasional slight chills, followed by heat flashes, a general sense of malaise, and a tired feeling in the legs. By degrees there appeared, much in the following order, symmetrical anæsthesia of the skin over the tibio-fibular space in both legs, gradually extending up the anterior surface of the thighs to the lower part of the abdomen, then to the tips of the fingers, the dorsal surfaces of the forearms, and around the mouth, œdema of the anterior portion of the legs between the knee and ankle, a sense of fulness, attended by occasional spasms or constrictions of the

muscles of the calves, slight pain in the knees, and weakness, which, with dropping of the feet and toes, caused him to stumble. Any considerable exertion brought on painful palpitation and præcordial oppression. Bowels sluggish, urine scanty.

Present Condition —He was above the medium Japanese stature, stout, but not corpulent, muscles firm and well developed. There was slight puffiness of the face, with characteristic sallow colour of the skin. The palpebral conjunctivæ were of normal hue, though the vessels appeared somewhat enlarged, tongue and mucous membrane of the mouth presented the same general appearance. Appetite fair, but had increased præcordial oppression after a full meal or the ingestion of liquids. The urine was of a brownish colour, no albumen, a very dark brown shade was given on the addition of an excess of nitric acid, becoming almost black on boiling. Inspection of the chest showed distinct vibration of the intercostal spaces over a large portion of the cardiac area, and palpation strongly impressed one with the violent, struggling action of the organ. Apex impulse below and to the left of the nipple, first sound entirely masked by a loud blowing murmur, most distinct in the third intercostal space on the left side, though audible at the apex, second sound normal, carotid and abdominal pulsation very marked. The blowing murmur audible over the heart was common to all the larger arterial trunks. Percussion showed decided enlargement of the cardiac dulness, pulse 109, full and strong, the vessel feeling double its normal size. Cardiac oppression severe, and increased by slight pressure on the epigastrium and walls of the chest. Firm pressure on the spinous processes of the upper dorsal and lower cervical vertebrae decidedly painful. Muscular sensibility very pronounced, especially in the gastrocnemii and pectoral groups, later, this was observed in the masseters and the muscles of the anterior portion of the forearms and inner sides of the thighs. The œdema of the anterior tibial regions had now become more or less general, a condition probably existing from the first, but less easily demonstrable.

17th June —Pulse 104. Feels somewhat better, a saline purgative having been administered early in the morning.

18th June —Pulse 98. Feels worse, and complains very much of the violent action of the heart, even while at complete rest. A sudden fall of the temperature, with rain, had occurred within the last 24 hours.

20th June —Pulse 90. Is somewhat less oppressed, in consequence of active purgation and draining away of fluids, but he is weaker.

21st June —Pulse 89. Heart's action still violent. Vomited about 12 oz of greenish-yellow fluid, which appeared to give temporary relief.

24th June —No material change since last note, gradual loss of strength, increasing anasarca, especially of the face, skin becoming of a leaden hue.

25th June —Pulse 110. Vomited several times to day, and is rapidly sinking. Is very restless, constantly changing his position in vain attempts to obtain relief from the sense of impending suffocation. Crepitant râles appeared in both lungs. The pulse rose to 120, and then disappeared at the wrists, the extremities became cold, and at 12 M he died rather suddenly.

Postmortem Examination, 24 Hours after Death —Rigor mortis wanting. Ecchymosed, purplish spots from the size of the finger-nail to that of the hand over the whole surface of the body. Tympanites inconsiderable. Subcutaneous areolar tissue gorged with serum. Intestines moderately distended with gas, colour bright pink, from capillary congestion, and very translucent, PEYER'S and the solitary glands appearing from the outside with a distinctness rarely observed from within. Peritoneal cavity contained about 12 oz of clear fluid. Lungs œdematous. Left pleural cavity contained 13 oz clear fluid, right 5½ oz. Pericardium contained 2 oz of the same clear fluid. Right auricle contained a large firm clot, filling a 2 oz graduated glass, one half of its surface covered by a firm, white fibrinous substance one eighth of an inch thick. Right ventricle contained an elongated hourglass shaped clot, extending through the valve into the pulmonary artery, and in the first and second ramifications of the vessel were small emboli, appearing as if recently detached from the main clot. This was beyond

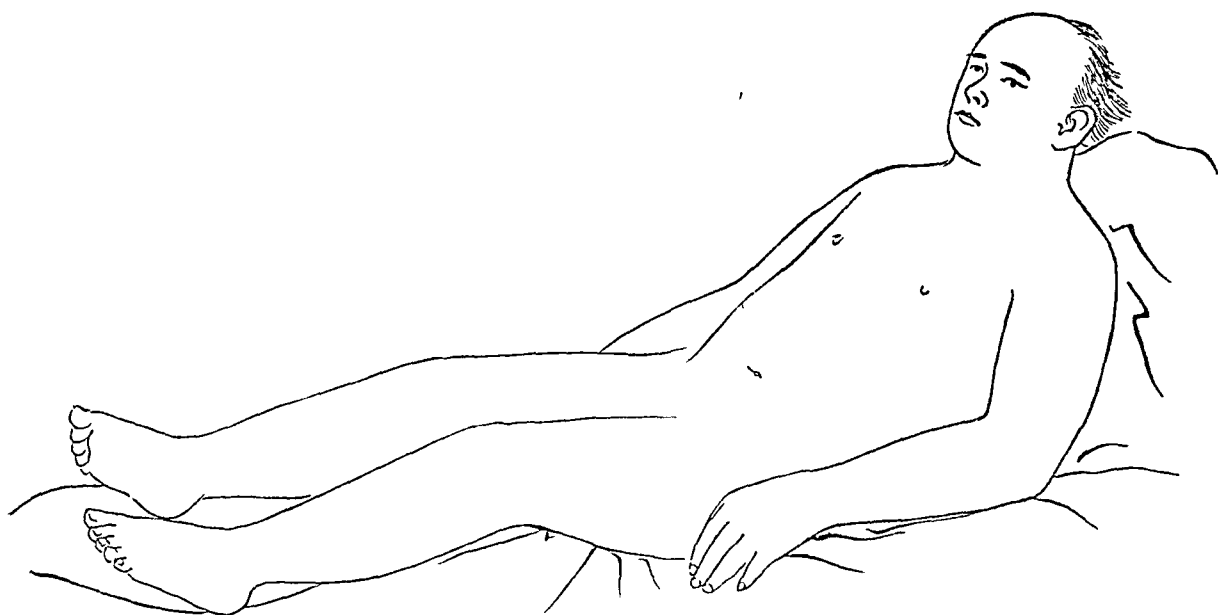
question an antemortem clot, as indicated by its extreme firmness and by the behaviour of the heart during life. A still further proof of this was the fact that a microscopic examination of the white fibrous portion revealed a capillary network containing blood corpuscles, not only on its surface, but penetrating its substance.* The left side of the heart contained a small quantity of feebly coagulated blood only. The cardiac valves were all examined with care, and showed no signs of disease. Weight of the organ when empty 14 $\frac{3}{4}$ oz. The ventricles were dilated, their walls attenuated, and the whole structure wanting in that degree of firmness proper to the normal heart. Microscopic examination demonstrated the muscular substance to have undergone degenerative changes. Stomach contained 8 oz of greenish-yellow fluid, its mucous membrane showing a number of dark red and purplish spots, giving it a mottled appearance. Spleen small and firm, weight, 5 oz 6 d. Liver presented no marked abnormal appearances, weight, 54 $\frac{1}{2}$ oz. Kidneys weight, 5 $\frac{1}{8}$ oz, dark in colour, capsules free.

CASE 2 Perniciou Beriberi, Death, Autopsy—N, æt 26 years, male, native of Tokio, but had lived for the past 13 years in a provincial town, previous general health good, except for a syphilitic attack. He came to Yokohama in May 1879. First symptoms made their appearance about the 15th August, and by the 24th, the date of coming under observation, all the typical phenomena of a case of wet beriberi had developed.

His general appearance was as follows: complexion, sallow white, lips and gums of their normal pinkish hue, conjunctivæ the same. The whole body presented a bloated, swollen appearance, especially the face and neck. Pulse 95, soft and full, temperature 98° 5 F. He complained of præcordial oppression and palpitation, weakness in the legs, and anæsthesia. In consequence of the œdema, it was difficult to define, by percussion, the size of the heart, its action was somewhat laboured, and there was a loud systolic murmur heard over the base of the organ, to the left of the sternum. Tongue slightly coated, bowels constipated, urine scanty but contained no albumen. For several succeeding days there was no change in the condition. Pulse ranged from 90 to 100 in frequency, temperature from normal to a degree or a fraction below it. He was given highly nourishing food, and an occasional dose of sulphate of magnesia. On the 16th September, when I saw him again, the general anasarca had much increased, and the jugular regions of the neck were swollen out of all proportion to the other parts of the body. The skin of the face was also much distended, giving him on the whole the appearance of a man who had been drowned. The chest oppression had become very severe, coarse bronchial rales were heard over the whole chest, and there was marked dullness on percussion at the base of the lungs, more especially on the right side. The next day, 17th September, he was much worse, pulse 110, and very feeble, intense distress in breathing, enormous swelling of the lateral portions of the neck had obliterated all its form and symmetry. It was remarked at this time that the paralysis of the lower extremities was somewhat less than at an earlier stage of the disease. There was little change from the foregoing symptoms, except in their intensity and gravity, for the two following days, when he expired, the mode of death being by asphyxia, and paralysis of the heart from over distension.

Postmortem Examination, 24 Hours after Death—Rigor mortis wanting, excessive general œdema, most marked, however, in the upper portion of the body. The recti presented a peculiar black-greenish colour throughout their whole breadth and length, while the muscular tissue in all other parts of the body preserved its normal pinkish colour. The external appearance of the intestines was somewhat peculiar, some portions showing a bright red arborescent injection (seen also by PRÆGER), while others were mottled with greenish grey spots. The peritoneal cavity contained 7 $\frac{1}{2}$ oz of clear serum. The mucous surfaces of the stomach and intestines exhibited marked signs of congestion throughout their whole length. Liver serous and cut surfaces somewhat dark, but otherwise apparently normal, weight, 56 oz. Kidneys capsule free, general appearance normal. Spleen size and appearance normal. Right pleura adherent throughout its whole anterior and lower portion, the remaining portion contained 14 oz of serous fluid. Left pleura entirely free, its cavity containing 27 oz of clear serous fluid. Lungs both

* I am aware that this is not only rare, but regarded as impossible by some observers.



CASE 2—BILIERIA HYDROPS APPLAPANCY PRESENTED 2 DAYS BEFORE DEATH

exceedingly œdematous, a frothy sero sanguinolent fluid flowing from their cut surfaces, quickly forming considerable pools on the table. Heart pericardium free, showing no signs of inflammation new or old, its cavity contained $1\frac{1}{2}$ oz of clear serum. The organ was large and remarkably flaccid, its tissue softened and of a dirty yellow colour. The unusual size of the heart appeared to be due to excentric hypertrophy. The right side contained a small amount of semi-fluid blood, left side empty. Endocardium and valves apparently normal. Microscopic examination of the muscular tissue of the organ showed it to have undergone primary degenerative changes, indicated by the indistinctness of the striations and in many parts their entire obliteration by fine granulations. All the large venous trunks were enormously dilated and filled with clotted blood (accounting for the lateral swelling of the neck always present in the last stages). The secondary divisions of the venous system, as far as could be traced, were also markedly distended and engorged with blood. Brain a small amount only of sub arachnoid effusion of serum existed, external appearance of the brain and its membranes otherwise apparently normal. The ventricles contained little or no fluid, cut surfaces of the brain substance firm and apparently normal. The spinal cord was removed with great care. Sub arachnoid effusion of serum inconsiderable. The nerve substance being exposed, and a stream of water gently poured over it, a partial disintegration and separation of its lumbar portion followed. Sections from the remainder of the cord, hardened in the usual manner, were subjected to a microscopic examination, and appeared perfectly normal.

The following history is not only typical of a case of dry beriberi, but is the most remarkable one in other respects that I have ever met with. The case is notable because the subject was a female, because of the number of successive recurrences or relapses of the disease coincident with three confinements from one to two years apart, and because of the extreme degree of atrophy and paralysis of the extremities, with subsequent apparently complete restoration to health.

CASE 3 *Beriberi Atrophica*.—Mrs M, æt 33 years, wife of an official of the better class, resides in an elevated, well drained locality on the side of the bluff facing the town. Was confined with her second child on the 1st July 1873. During the last months of pregnancy had experienced a sense of weight in the lower extremities, and shortness of breath on exertion, more marked than while carrying her other child. Delivery was normal, child well formed and apparently healthy, but it died in three days from causes unknown, the mother's milk disappearing without trouble. During the subsequent ten or twelve days, she frequently complained of constriction of the calves of the legs, and more or less pain on pressure or forced movement in the muscles of the anterior part of the forearm. Occasional feelings of oppression in the præcordia, and slight palpitation were also noted. On attempting to stand at the end of the twelve days mentioned, she found herself quite unable to do so. Her condition from this time became steadily worse, she suffered little when quiet, but muscular movement produced pain. On the 1st September, two months after confinement, she was admitted to the hospital, completely helpless, not being able to extend or flex a limb, or move from side to side unaided. The muscles of the extremities were extremely atrophied, the anterior tibial muscles were paralysed, while those of the calves were much contracted, bringing the foot into a complete talipes position, the dorsal muscles of the forearm were paralysed, and the palmar contracted, bringing the fingers tightly into the hand. Any attempt made to rectify these abnormal positions was productive of great pain. The pulse was small, the heart apparently contracted and acting feebly, and there was present the metallic systolic ring of chronic cases. Tongue clean, appetite fully good, bowels slightly constipated, urine normal in quantity and quality. She complained of nothing but some constriction of the chest, and palpitation, these varying in degree with atmospheric changes.

At this time I took, with the harpoon, several specimens from the muscles of the calf and from the tibialis anticus for microscopic examination. These showed extreme degeneration of the muscular elements.

A variety of means were with but little success resorted to for her relief, including electricity, strychnin, nion, frictions, and so on. At the end of two months she was transferred to an invalid resort in the mountains, the result being most satisfactory—a change immediately taking place for the better. Four months later she again entered the hospital, being now able to raise herself to a sitting posture and change her position in bed, while the rigid contracted condition of the muscles had partially disappeared, one finger only (the little one) remaining tightly flexed. The former extreme atrophy of the muscles had been followed by a considerable increase in their bulk.

Specimens again taken with the harpoon demonstrated a partial restoration of the primitive muscular elements. After remaining a month longer in the hospital, she returned home. Improvement continued during the following summer and winter months, until she could be up and walk about.

In the meantime she again became pregnant, and in June 1874 was delivered of a healthy child. With this event, the old symptoms returned. Paralysis and atrophy of the partially restored muscles of the limbs followed, and at the end of ten weeks she again entered the hospital. Her condition was not so bad as on the first occasion, as she could turn over in bed unaided, and to some extent move the limbs. The heart symptoms were about the same. Remembering the benefit gained by her sojourn in the mountains, she again spent several months there, with the same decided benefit. Early in the spring she returned home, and, to my surprise, could walk with comparative ease, though unable to quite bring the heel to the floor, in consequence of some remaining contraction of the muscles of the calves. The whole body, including the extremities, was plump and well rounded, and she appeared as well as before her first attack. During the following summer she again became pregnant, and her confinement was followed by a third relapse, but in a much milder degree. From this she readily recovered, going at once to the mountains, and remaining until well.*

CASE 4. *Chronic Beriberi Hydrops*.—O, æt 28, member of one of the feudal families, came to Yokohama in January 1873, to fill an important government position. His family history was good, had suffered from no specific disease, and had previously to this enjoyed good health. Was first seen professionally, 10th June, and his general appearance was quite characteristic of the class of persons subject to this disease, viz stature medium, body well proportioned, without superabundance of fat, but decidedly plump, muscles well developed and firm. Notwithstanding these general appearances of good health, the skin was of a characteristic sallow hue, in fact, an taint of a light shade. The conjunctivæ, and mucous membrane of the gums, lips, and tongue were of a dark red colour. He was unable to give the exact date of the invasion of his disease, but stated that at about the end of April, six weeks before, he began to feel unwell, with an occasional sense of feverishness, malaise, and of fatigue in the whole body, though most marked in the legs. There was a corresponding condition of mental languor, with an inability for continued thought, and a constant disposition to postpone the business of to-day until to-morrow. As the season advanced, other special symptoms appeared, such as œdema of the anterior tibial region and anæsthesia of the skin covering the muscles of the tibio fibular space. Any considerable exertion caused palpitation of the heart and præcordial oppression. Bowels sluggish, urine diminished in quantity, appetite not materially affected, but ingestion of liquids, or a full meal, increased the chest oppression. There was also a tendency to stumble in walking. Inspection of the chest showed distinct vibration over the cardiac region synchronous with the heart's impulse. Epigastric and abdominal pulsation were marked, and pressure even to a moderate degree in the epigastrium was attended by a sense of suffocation. Pressure on the chest, left decubitus, or any force applied so as to interfere with the heart's action, was followed by feelings of great distress. The pulse was normal in frequency, but soft and very markedly wanting in tone, so much so that it gave to the finger the sensation of a fluid propelled through a collapsed india-rubber tube, this is in my experience a pathognomonic symptom of beriberi in certain stages. Percussion showed the heart to be slightly enlarged, and auscultation gave a feeble bellows murmur, limited to the left side of the sternum, third intercostal

* Since that time now four years, she has not been pregnant, and presents no signs of having ever suffered from the disease, though living in the same locality as when first attacked.

space. The same murmur could be heard in the large arteries. Liver normal in size. Pressure on the muscles in various situations elicited pain, most marked in the calves, the inner side of the thighs, and the pectoral and intercostal groups. Pressure on the spinous processes of the lower cervical and upper dorsal vertebrae gave decided tenderness. Having frequent occasion to see him, it was found that his symptoms and condition were constantly changing, and that certain meteorological variations, more than anything else, contributed to this: thus, a sudden fall of temperature, with rain, especially after a few days of steady, high thermometer, was followed by a marked exaggeration of all his symptoms, sometimes these would be sufficiently severe to compel him to remain at home, or to go to the country until the weather settled again. Increased sluggishness of the bowels was a constant attendant of these exacerbations, but a brisk cathartic administered at these times always produced decided relief of nearly all the symptoms, especially if four or five large watery stools could be obtained. A diuretic mixture was usually given at the same time and kept up for some days, indicated by the scanty flow of urine present. Frequently, if these remedies were used promptly, the patient would recover from this temporary exacerbation quite rapidly, and after a day or two of rest could resume his duties.

In this way the first season was passed, with the addition of a couple of weeks in the mountains during the summer vacation. In the ensuing winter all the symptoms of the disease disappeared, but with the spring they again presented themselves. During the summer months the same periodical exacerbations were experienced, but less frequently and in much less severity, relief being afforded by the means previously employed. With the winter season he again seemed quite recovered. By the third summer the symptoms were fewer and milder still, so that there was less occasion to prescribe even the simple remedies which had before given him relief, and in the fourth year scarcely any traces of the disease remained, omitting those connected with the heart. Even these would have been difficult to recognise by one unacquainted with the history of the case, and all that could be said of the organ was that its action seemed somewhat feeble.

CASE 5. *Subacute Beriberi Hydrops*.—H, æt 19, a student, son of one of the old feudal princes near Kyoto, 200 miles distant. Family history good, had never had syphilis or rheumatism, and general health always good. Came to Yokohama to reside nine months ago. Present residence was in second story of a house in good locality. Presented himself at the hospital, 19th April, with the following history and symptoms. He had not been feeling well for some three weeks, but attributed his malaise and general sense of fatigue to a cold. Ten days ago he experienced, after a short walk, an unusual tired feeling in the legs, accompanied by a heaviness and constriction in the muscles of the calves, and, upon exertion, painful palpitation of the heart. Attention being directed to his legs, there was found œdema over the tibiae, not extending below the malleoli, and numbness of the skin over the tibio-fibular spaces. On walking to the hospital a few days afterwards, he found that the trouble in his legs was worse, that there was, in addition, a peculiar weakness of the knees, and that difficulty was experienced in lifting the toes from the ground, so that very little inequality in the way caused him to stumble.

He was of medium height, rather fleshy, though not corpulent, with all the appearance of being well nourished. Skin slightly sallow, that of the face a little puffy, eyes clear, mucous membranes of normal hue, or possibly a shade darker, tongue clean, appetite but little impaired, digestion good, though he suffered some precordial oppression on taking a full meal, bowels slightly constipated, urine scanty and of a light amber tint, giving a deep brown with nitric acid in excess—increased by boiling. Intellect clear, but he was indisposed to mental exertion. The œdema, paralysis, and anæsthesia in the legs had considerably increased since the first observation. In addition to the sense of constriction in the muscles of the calves, there was decided tenderness on pressure, this also existed in the muscles of the inner sides of the thighs, and intercostal and pectoral regions. The intercostal spaces over the heart showed a peculiar vibration with the cardiac impulse, with slight lifting of the ribs, indicating much exaggerated action of that organ. A distinct blowing sound, most intense over the third intercostal space to the left of the sternum, was heard with the systole, diastole normal. The same murmur could be heard in the principal arterial trunks.

The cardiac dulness was slightly increased, apex beat most distinct below and one inch to the left of the nipple Pulse 90, very large and soft

22nd April—Pulse 86 He feels worse, the anæsthesia has extended to the lower part of the abdomen, cardiac palpitation and oppression rather increased

25th April—Pulse 108 Anæsthesia now surrounds the mouth, and has reached the tips of the fingers

26th April—Pulse 100 Suffers from chest oppression and palpitation on the least exertion Pressure on the epigastrium, even with the tip of the finger, cannot be tolerated, as there is immediate increase of the above symptoms, left decubitus, or any mechanical interference with the action of the heart, producing the same result

27th April—Pulse 90 Feels better, relishes his food

28th April—Pulse 95 Is worse Temperature of the atmosphere had suddenly fallen during the night, with rain Is unable to rise or walk without aid The anasarca has increased, and the case has assumed a serious aspect

29th, 30th April—But little change, takes less nourishment A brisk cathartic, followed by five or six watery stools, gave marked relief This was the first instance in which I had used this remedy, the case being one of the earliest under my care and observation For the next few days there was little change as far as the paralysis and anæsthesia were concerned, though the effect of the cathartics in reducing the effusion which had commenced to collect in the serous cavities and subcutaneous areolar tissue was very apparent By degrees the other symptoms began to improve, palpitation and precordial oppression diminished the heart murmur became less distinct, and the colour of the skin approached its normal hue As soon as he could be moved he was sent to the mountains, where he ultimately completely recovered

This, it will be noted, was early in the season not only for a case to appear, but to end in recovery, as ordinarily attacks begin some weeks later, and substantial improvement only commences with the winter months In this year, however (1873), the disease was of unusual severity, and the early appearance and gravity of the symptoms of this case may thus be accounted for

I have not thought it necessary to note the daily temperature, as it rarely rose above normal, and often sank a little below it Although the stages of beriberi may generally be divided into the prodromic, subacute, acute or pernicious, and chronic, it will be seen by a glance at the history of the preceding cases that this is to a certain extent schematic, as the stages often insensibly merge into each other, so that it is difficult to say exactly where one ends and another begins

As it has been shown that the period of incubation in the vast majority of cases is several weeks, or even months, and that the prodromic period is more or less protracted, it would greatly simplify the consideration of these various stages were the definition already given of the disease as a chronic affection, adhered to, and the acute attacks considered as simple exacerbations of it Especially is this the case in the dry form, in which the pernicious stage never appears

CASE 6 *Mixed Beriberi Atrophica and Malarial Intermittent*—M, æt 24, government officer Family history good Has never had any severe disease or syphilis Came to Yokohama from the country three years ago (1877), in March In August of the same year, had a mild attack of beriberi atrophica, from which he recovered completely during the winter Last year, about the same time, the disease again appeared, still in a mild form, which was again recovered from as soon as cold weather set in

This year (1879), the complaint returned a month earlier than heretofore The usual train of

symptoms, viz, heaviness in the legs, anæsthesia, muscular tenderness, palpitation, etc, was much more pronounced than in his previous attacks. These continued to worry the patient, without much variation, till the 1st September, when a decided change for the better was experienced, and, considering the lateness of the season, no further serious trouble was anticipated. On the last day of the month, however, when feeling himself newly free from the disease, he was suddenly seized with a severe chill. This was followed by high fever. On the next day (1st October), another chill occurred at about the same hour, also followed by severe fever and a sharp attack of diarrhoea. The muscles of the calves of the legs were exceedingly painful on pressure or on an attempt at motion, so that he found himself unable to stand or walk. During the night the muscular hypersensibility became general. The abdominal and intercostal groups were especially affected, so that respiration was difficult, and coughing caused intense suffering.

2nd October —Entered the hospital with same symptoms, and in the condition just described. Temperature morning, 103° F, evening, 102° 8. Pulse 136, respiration 42. The chill to day was not quite so severe as on the two previous occasions, heat and thirst, however, were much complained of, tongue dry and coated, occasional nausea. Ordered a seidlitz powder, to be followed after its operation by 15 gr of quinine.

3rd October —Temperature morning, normal, evening, 100°. Pulse 100, respiration 35. General condition very much better, heat and thirst no longer tormenting, tongue moist, no nausea. No recurrence of the chill. The character of the pulse was that so often observed in beriberi, viz, soft, full, and greatly wanting in tone, systolic murmur very distinct over base of the heart to the right of the sternum. Muscular hypersensibility still general, and unusually pronounced. In this case even the dorsal groups were exceedingly painful on pressure, a condition which I had not observed before in this disease. Respiration still painful, and more or less difficult. Quinine continued. Ordered a diuretic mixture.

4th October —Temperature morning, 99° 4, evening, 100°. Did not feel quite so well as yesterday. Character and frequency of pulse unchanged, tongue clean, bright red at the edges, no appetite. Paralysis of the muscular groups, characteristic of beriberi, very pronounced, so much so that the patient was unable to change his position or feed himself. Treatment not changed.

5th October —Temperature morning, 99° 4, evening, 101° 5. Pulse 100, respiration 36. No special change, except some increase of thirst towards evening. Treatment same. Nausea ceasing, a fair amount of nourishment was taken, consisting of rice, soup, milk and eggs.

6th October —Temperature morning, 100° 9, evening, 101° 6. Pulse 100. Does not feel so well, the sense of weight on the chest and difficulty of breathing greatly increased. Pulse very full and soft. Intercostal cardiac pulsations very much increased, and visible over the whole præcordial region. The systolic murmur, before only heard at the base of the heart, now audible over the entire organ. There was no œdema, however, or signs of serous effusion in any of the cavities. Some increased thirst and sense of feverishness.

The weather, which had been quite warm for several days, had become suddenly cool. A drizzling rain had set in during the night, and the atmosphere was saturated with moisture. It will be seen by the record of this day that the symptoms proper to the beriberi factor in the case had increased in severity far out of proportion to the rise in temperature or other evidences of fever.

I conclude, therefore, that the exacerbation of the special phenomena of beriberi was due alone to the atmospheric changes noted, which play such an important part in the progress of the disease.

7th October —Temperature morning, 100°, evening, 99° 9. Pulse 99, respiration 40. No change in the special symptoms of the beriberi element in the case.

9th October —Temperature morning, 99° 6, evening, 99° 9. Pulse and respiration same. Ordered 20 gr quinine, in divided doses.

10th October—Temperature morning, $98^{\circ} 1$, evening, $98^{\circ} 6$ Pulse 82, respiration 28 Felt decidedly better in every respect The muscular hypersensibility appeared less pronounced, and amelioration in the various morbid phenomena referable to the circulatory system was very marked The bowels being somewhat constipated, an ounce of castor oil was given Quinine continued

11th October—Temperature morning, 98° , evening, normal Pulse 80, respiration 30 Less malaise The paralysis, on the other hand, was more pronounced, though the pain on motion was less Had for the first time a little appetite Reduced quinine to 15 gr

12th October—No change, except a gradual increase in the paralysis

13th October—Temperature morning, $98^{\circ} 1$, evening, 99° Pulse 82, respiration 28 Symptoms unchanged Reduced quinine to 10 gr A considerable desire for food being expressed, a liberal diet was ordered The tongue being clean and the secretions little, if any, disturbed, no especial medication other than the quinine was thought necessary

14th October—Temperature morning, $99^{\circ} 1$, evening, 100° Pulse 70, respiration 30 General condition unchanged Ordered quinine 20 gr, in divided doses, as before

15th October—Temperature morning, normal, evening, $99^{\circ} 4$ Pulse 85, respiration 28 Felt somewhat better

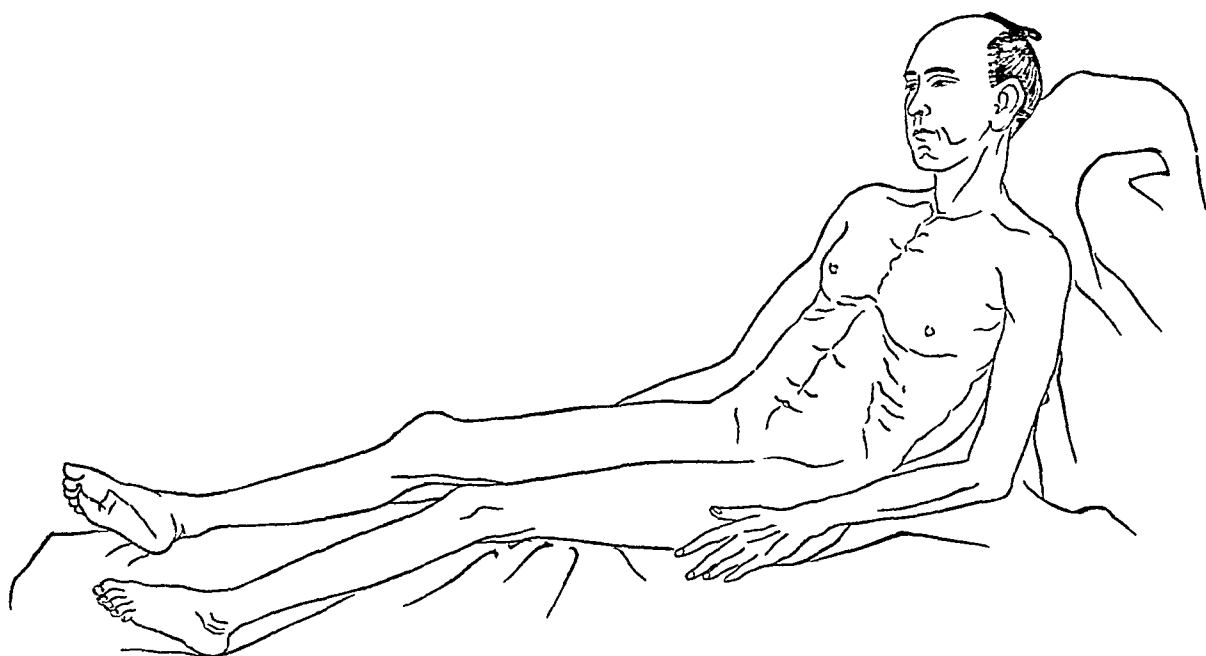
17th October—From this time on, the temperature did not rise above 100° , and all symptoms of fever disappeared, except occasionally towards evening, and even then were very slight On the 20th the patient declared himself quite well, except for the paralysis affecting the lower extremities and the extensors of the fingers and hand, he being still unable to stand alone or feed himself A curious anomaly here appeared, in that the index fingers of both hands preserved their power of motion The sensibility in the bills of the fingers, which had been nearly lost, now began to return It was observed that this followed immediately on the skin peeling off from them This is the only case in which I have observed this phenomenon The paralysis of the muscles of the trunk was the first to diminish, which early enabled him to turn in bed and assume the sitting posture, that of the extremities rapidly disappeared, so that on the 25th he was able to walk, and on the 27th left the hospital for a few days at the baths in the mountains before returning to duty The only treatment made use of for the relief of the paralysis was friction with turpentine liniment, and kneading of the affected muscles

This case is one of peculiar interest, as showing most clearly the existence of two distinct and specific poisons of miasmatic origin operative in the same subject at the same time Among complications of beriberi, the so-called marsh malarial element is not a very serious one, from the fact that in most cases it can be quickly eliminated by the administration of quinine, as shown in this case by the cessation of the periodical chills and the fall of temperature after the first dose of 15 gr

CASE 7 *Mixed Beriberi and Typhoid Fever*—A, æt 26, merchant Was seized on the 5th October with a severe chill, followed by fever and a sharp diarrhœa of 20 or more watery stools in 24 hours On the 10th the diarrhœa had become much better, the passages being reduced to two or three in 24 hours, feverish symptoms, however, continued

14th October—Rather suddenly became much worse, thirst tormenting, appetite lost These symptoms continued with little variation till the 20th, when he entered the hospital Temperature taken by the house physician, $103^{\circ} 1$

21st October—Temperature morning, $102^{\circ} 8$ Pulse 100 Patient's expression indicated a serious illness, tongue covered with a thick yellowish brown coating, thirst severe, entire loss of appetite, diarrhœa somewhat troublesome, consisting of three or four watery stools, right iliac tenderness marked, skin dry, hot, and showing a rose coloured eruption disappearing on pressure Pulse 100, soft, full and without tone A loud systolic murmur over the pulmonary artery, also in the larger vessels, intercostal



CASE 7—MIXED BERIBERI AND TYPHOID FEVER (FROM A PHOTOGRAPH)

pulsation over much of the cardiac region, muscular tenderness more or less general, but most marked in the calves and the pectoral region, abdominal muscles also painful on pressure, especially on the right side. Treatment was directed chiefly to the fever, without regard to the beriberi element in the case. Ordered 2 oz brandy, with milk and egg, and a diuretic mixture with a sleeping draught. In consequence of gastric irritability, the milk and egg was vomited, even water being rejected. The sedative, however, was retained, and gave the patient a quiet night, which he had not had for some time.

22nd October—Temperature $103^{\circ} 8$, pulse 100. A sheet, folded so as to cover the chest and abdomen, dipped in iced water, was applied frequently, and the temperature fell to $101^{\circ} 4$. As the patient complained of the treatment it was not continued, and $103^{\circ} 8$ was again reached in the evening. He now complained of great distress referred to the chest and gastric region, which he attempted to relieve by putting his finger down his throat, retching only being produced with little benefit to him. A tormenting cough now set in, accompanied by bronchial râles. Had two loose stools.

23rd October—Temperature $103^{\circ} 6$, pulse 102. Had less nausea, cough the same, tongue thickly coated and very dry. All the specific symptoms of beriberi unchanged, except that slight drooping of the feet indicated commencing paralysis of the anterior tibial groups. No œdema. In addition to the rose-coloured eruption, a blush of considerable intensity tinged the skin over a great portion of the body. Evening temperature rose to 105° , pulse 120, respiration 38. Tongue still very dry, coating almost black. Was very restless and groaned constantly. Cough even more troublesome than yesterday.

24th October—Temperature $103^{\circ} 6$, pulse 104, respiration 35. Had slept moderately well after a sleeping draught, and felt somewhat better. Continued the brandy and milk. During the night bled freely from the nose, tongue slightly moist. A new crop of the eruption made its appearance, with fading of the old. Cold pack again applied, and temperature fell to 100° , which lasted for three hours, but it rose again in the evening to $103^{\circ} 6$. Heard with difficulty the ordinary voice, tongue again dry and dark, sordes about the gums. Increased brandy to 3 oz daily, and repeated the sleeping mixture.

25th October—Temperature 103° , pulse 98, respiration 35. Appeared much better, tongue a little moist. Cold pack repeated. Temperature fell to $100^{\circ} 2$. Pulse 100. Repeated sleeping mixture.

26th October—Temperature 103° , pulse 108, respiration 36. General appearance better than yesterday. Cough nearly gone. Tongue had lost its dark colour, and become red and fissured. Wet pack renewed at 9 A.M. Temperature $99^{\circ} 6$, but it rose again at noon to 103° . Pack applied again at 3 P.M., when the thermometer marked $100^{\circ} 4$, during the night, however, it rose to 104° . Pulse 110. Was very restless notwithstanding the sleeping draught. General symptoms about the same, except that the cough returned.

27th October—Temperature 103° , pulse 112. Symptoms unchanged. Prescribed $\frac{1}{4}$ gr morphine for the cough. Gurgling in right iliac region. New crop of eruption appearing. Wet pack applied at 1.30 P.M., when the temperature fell to $100^{\circ} 2$, but rose again to $103^{\circ} 4$ in the evening. Pulse 112. During the night, broke out in a profuse perspiration.

28th October—Temperature morning, 102° , evening, $102^{\circ} 4$. Pulse 100, full, but weak. Skin bathed in perspiration. The heart murmur which had been loud, commenced to diminish with the appearance of the perspiration, and now was scarcely to be heard. The cough still continued somewhat troublesome.

29th October—Temperature $100^{\circ} 6$, pulse 102. Symptoms but little changed. The paralysis, however, of the anterior tibial muscles and the contraction of those of the calves had steadily gone on from its first appearance till the foot assumed the characteristic drooping position of the severer forms of dry beriberi. From this time the improvement in the fever symptoms suffered few interruptions, the paralysis and atrophy were also rapidly recovered from, so that when discharged on the 10th November the patient was able to walk with the aid of the nurse.

ANALYSIS OF INDIVIDUAL SYMPTOMS

a Symptoms referable to the Skin

Colour—This I have described as sallow-white. Though this term is applied to the colour of the skin in anæmia and various cachexias, in this disease, according to my view, it depends on neither of these conditions. That it is not due to anæmia is evident from the invariable pinkish hue retained by the conjunctivæ and buccal mucous membrane. Examination of the blood in some cases shows an increase in the number of white blood corpuscles, while in others there seems to be no change in their number relatively to the red globules. Still less am I disposed to refer this discolouration of the skin to a cachexia, for in beriberi it is among the earliest conditions observed. The explanation is more probably to be found in circulatory disturbances dependent on vaso-motor derangements.

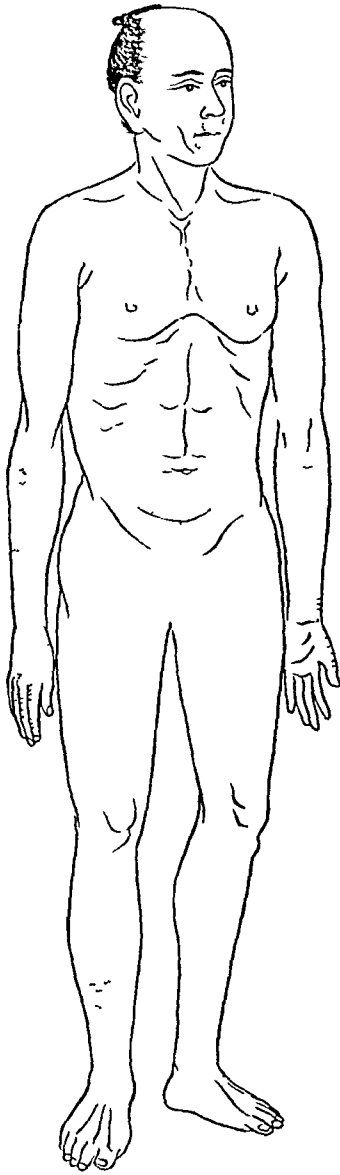
Anæsthesia—As will be remembered, this is one of the most characteristic symptoms of beriberi. In nearly all cases it is the first indication of the invasion of the disease, appearing over the anterior tibial muscles, and simultaneously, or a little later, in the tips of the fingers and around the mouth. It not unfrequently happens that for a long time it remains confined to these regions. When spreading beyond or attacking other parts, it uniformly follows the same course. Thus, that of the anterior tibial regions extends up along the inner side of the thighs and across the lower part of the abdomen, rarely as high as the umbilicus. That of the tips of the fingers follows the dorsal surface of the hands and forearms, but stops at the elbows. In exceptional cases only are other areas of skin involved. Its progress is always uniform and symmetrical, and never marked by any discolouration.

b Temperature

The almost invariable low thermometrical range in uncomplicated cases is commonly noted by all recent observers. So well established is this point that it is of decided diagnostic value in doubtful cases.

c Symptoms referable to the Circulatory System

Pulse—Large, soft, or markedly wanting in tone, giving the sensation, as already expressed, of a fluid forced through a spent india-rubber tube. This is characteristic of the subacute and acute stages of wet beriberi and is often met with in an exaggerated form. This pulse is liable to variations, and is often apparently caused by weather changes, from dry to wet or moist days. In the dry form of the disease the opposite condition is observed, *ie*, as regards size and tone, the pulse being in the one case often visible to the eye, while in the other some little care will be necessary to distinguish it by the sense of touch. Not much change is observed in its frequency, except in the severer cases, or during the last stages of the disease. As might be inferred, murmurs are only heard when marked want of tone is present. The same want of tone is noticed in the venous system, especially during the last stage of fatal cases, when the larger trunks become enormously dilated. This may be recognised during life by the



AREAS OF ANÆSTHESIA IN BOTH FORMS OF BERIBERI

swollen condition of the lateral portions of the neck, in some cases entirely obliterating the inferior maxillary fossæ. Postmortem examination reveals vast distension of the ascending and descending cavæ, and the frequent presence of large clots, due to mechanical pressure from regurgitation consequent on tricuspid insufficiency, and the want of resistance in their walls or coats. In some cases murmurs and pulsations are recognised very early.

Heart—The morbid phenomena referable to the heart are numerous. Among the most characteristic symptoms, and one of the first recognised by the patient is palpitation. Though most pronounced on making any considerable exertion, it is often painful when lying perfectly quiet in bed. A sense of oppression in the præcordia is at the same time complained of, and is rarely absent in marked cases. An examination of the chest reveals varying degrees of intercostal pulsation, sometimes involving nearly the whole cardiac region. A decided thrill is at these times communicated to the hand, and the apex beat is felt to the left of its normal position. The action of the organ, sensible to the patient and observer, is often tumultuous and even struggling. Percussion reveals an increased area of dulness. Auscultation discloses systolic murmurs most distinct in the third and fourth intercostal spaces at the left of the sternum, and sometimes audible over the entire cardiac region. The postmortem appearances of softening and dilatation of the whole organ are confirmative of all the clinical symptoms above detailed, independent of endocardial or valvular lesions, which have never been found to exist. Aortic and abdominal pulsations are also very frequent. In the earlier stages of the disease the symptoms referable to the heart are variable, on some days nearly absent, to reappear perhaps suddenly with abrupt meteorological changes. In the dry form, and in old or chronic cases, many of the above symptoms are either greatly modified or wanting, this being probably due to less rapid degeneration of the muscular tissue of the organ. It would seem as though in the wet form the heart is first weakened by paresis of the cardiac ganglia, with consequent incomplete emptying of its cavities. This, in connexion with rapid degenerative changes in its muscular tissue, causes the walls to yield to blood pressure, producing dilatation, tricuspid insufficiency with regurgitation, and, as a consequence, capillary stasis and dropsy. Vaso-motor paralysis, acting at the same time on the pulmonary artery and arterioles, and on the large arterial trunks generally, probably gives rise to the murmurs heard in them.

In the dry form of the disease the vaso-motor paralysis is less pronounced, and the degenerative changes in the muscular tissue of the heart slower, hence its atrophy. From this it follows that, instead of a large dilated heart, we have a small weak one with a narrowed tricuspid orifice, rather than distended, little or no intercostal pulsation, and hence less cardiac dulness, no venous regurgitation or capillary stasis.

d *Symptoms referable to the Respiratory Organs*

It is not until the last stages of the wet form of the disease that the respiratory organs become involved. The breathing is then fearfully oppressed, causing the patient to resort to every possible expedient to obtain relief, the countenance is anxious and cyanotic. Dulness will now be found to a considerable extent over the whole chest, with coarse bronchial râles, a purely consecutive condition dependent on œdema filling the lungs in common with all the organs of the body.

e *Symptoms referable to the Digestive System*

There is but little change in the appearance of the tongue, except when the disease is complicated with some febrile disorder, or in the last stages of the severer cases

The appetite is not much impaired in the milder forms of the disease, and continues moderately good even after the symptoms indicate considerable danger. Some cases have been observed where a morbid craving for food has been gratified by a large meal, which has been followed by a speedy death, probably from upward pressure on the diaphragm and overthrow of a weakened and dilated heart. There is scarcely ever any nausea except in the later stages, and vomiting is always indicative of a rapidly fatal issue. The bowels are constipated in the wet form of the disease, but little deranged in this respect in dry beriberi. Watery or dysenteric discharges usually indicate that the case is a complicated one.

Liver—In some cases there is slight tenderness on pressure only, jaundice and other symptoms of hepatic derangement are absent.

Spleen—There are no morbid symptoms referable to this organ, according to my observations.

f. *Symptoms referable to the Urinary Organs*

In the wet form of the disease the urine is always less in quantity than normal. It is rarely high coloured and is without albumen. I have often noticed that on boiling with an excess of nitric acid, it assumes an almost black appearance, which may be due to bile or blood pigment. In the dry form the urinary secretion presents nothing abnormal in quantity or quality.

g *Symptoms referable to the Nervous System*

Mental Faculties—These are preserved intact throughout the course of the disease in all its forms and stages.

Paralysis—The cause of the paralysis in beriberi is a question by no means yet settled. The opinion, so far as I am aware, is universal that the cause is seated in the nervous system, more particularly in the spinal cord. With this idea, whenever opportunity has been had for postmortem examination, especial attention has been given to the condition of those parts, by which an explanation could be offered of the morbid nervous phenomena of the disease. By the authors already quoted, serous effusion was found in the subarachnoid spaces of the brain and spinal cord, and in the ventricles, by some, congestion of the meninges was noted. By far the most important anatomical lesion recorded, however, is softening of the cord, and it is impossible to deny that a condition resembling softening has been found in many of the autopsies made. In general, such evidence justifies the conclusion of its antemortem existence, and a train of clinical symptoms will have been found to attend its invasion and progress, such as fever, pain along the spine, convulsions, bladder disturbances, morbid conditions of the sexual organs, obstinate constipation or loss of power in the sphincters, bed sores, and in severe cases complete paraplegia. In beriberi none of these conditions exist, even in fatal cases.

the degree of paralysis is not in accordance with the gravity of the other symptoms. In a case where I found softening, the power to move the lower extremities appeared to improve during the last days of life. In the dry form of the disease the severity of the other symptoms is not in proportion to the paralysis and atrophy, these latter often being extreme, while the usual symptoms attendant on a mild degree of organic change of the cord are wanting. An important point in this connexion is the fact that however far advanced these conditions of atrophy and paralysis may be, they are in a majority of cases completely recovered from in a short time. In view of these facts, I am strongly disposed to regard the condition of softening as not antemortem, but as consecutive to serous imbibition (as is observed by GINTRAC, and similarly in chlorosis by SANDRAS and EISENMANN*), taking place during the last moments of life or after death, when the vital forces no longer oppose themselves to the mechanical disintegrating power of the fluid with which the nervous as well as all the other tissues and organs of the body are engorged.

The affected muscles themselves remain now to be studied in searching for the seat of the morbid phenomena they present, paralysis, atrophy, etc. Nowhere in the literature of the subject do I find the possibility of their myopathic origin taken into serious consideration, attention having been absorbed by the idea of their neuropathic source. From an early period in my observations, however, I was impressed with the fact that the clinical symptoms specially referable to the muscular system were not dependent on primary derangements of the motor nerve centres or the conducting trunks, consequently I took every opportunity of examining specimens from living subjects at various stages of the disease, as well as those obtained at autopsies. In a considerable number of cases I succeeded in overcoming the prejudices of patients against being harpooned for this purpose, with the result that whenever there was paralysis, however slight, muscular degenerative changes were found to exist. The importance of this fact warrants the following recapitulation of the studies made on the muscular tissues: 1. The anatomical changes were in exact relation to the degree of paralysis and atrophy (this was true not only of the degree of change in the individual fibres, but of the number of those affected in the secondary bundles), 2. Specimens from the wet form of the disease, especially those obtained at autopsies, showed different degrees of commencing degeneration in different groups of muscles, from simple indistinctness of the striations to their total eclipse by a nearly homogeneous cloud of minute granulations.

In few cases of the wet form do the muscular degenerative changes pass beyond this stage, which accounts for the absence of atrophy and the often rapid disappearance of the paralysis, while in the dry form the complete emptying of a certain number of sarcolemma sheaths accounts for the extreme atrophy and paralysis, and the consequent slower recovery.

Still more important are the degenerative changes found to have been sustained by the heart muscle. In my first autopsy, owing to the season and the difficulties attending its performance, the microscopic appearances were not satisfactorily determined, though sufficiently well to say that a marked change had already taken place in the histological elements, while the whole organ had assumed a yellow flabby look. In my second case scarcely a fibre of the

* JACCOLD *Les Paraplégiés et l'Atrocie du mouvement*, p. 440

muscular structure was normal, all having undergone granular metamorphosis, to the total obliteration of the striations

In all the electrical experiments made on the voluntary muscles the degree of excitability was in the inverse ratio to the pathological changes they had undergone

b *Muscular Hyperæsthesia or Tenderness*

This is a constant symptom in both forms of beriberi. Its usual location in special groups of muscles has already been mentioned. In a certain number of cases, however, it is more or less general, though often not complained of unless sought for by pressure. This general muscular sensibility may be so pronounced that the patient is perfectly helpless, because of the pain produced by the least attempt at active motion (Case 6, and that of the student already referred to in detail, are striking examples of this). When affecting the respiratory groups it no doubt plays an important rôle in the oppression experienced.

The sudden appearance and disappearance, or diminution, of muscular hyperæsthesia, often observed, is most difficult of explanation. No more so, however, than of some of the other characteristic phenomena of this disease, such as the anæsthesia of the skin, heart palpitation, etc. They would appear to indicate that the exciting cause gives rise primarily to functional, trophic and vaso-motor derangements, to be succeeded on prolonged exposure to its influence by anatomical changes, especially observed in the muscular tissue. This theory is supported by the fact of the rapid amelioration of all the symptoms, often observed on a removal of the patient from beyond the influence of the poison, and then equally quick return on his being again brought within its reach.

The symptoms furnished by the affected muscles, especially those of the calves of the legs, viz., a sense of swelling, tension or hardening, contraction, occasional spasms, and often severe pain on pressure or motion, would appear to indicate the existence of some active or acute process going on within them. If so, the symptoms of excessive hyperæsthesia occasionally observed in all the muscles of the body would be susceptible of the same explanation. Should this be admitted, we have presented the extraordinary phenomenon of a generalised inflammation of muscular tissue. I only suggest this as a possible explanation of the symptoms, though I am at a loss to account for their often transient nature, if from this cause. A somewhat remarkable fact may be mentioned in this connexion, viz., that the muscular groups which first give evidence of loss of power (the anterior tibial muscles and flexors of the hand) are never painful on pressure.

1 *Diopsy*

As a symptom of beriberi diopsy is confined to the wet form of the disease. Its first appearance over the anterior tibial region is indicated by pitting on pressure. The usually plump appearance of patients is probably due to a moderate degree of general subcutaneous infiltration. In most cases the amount of effusion remains inconsiderable for days, and even weeks. Effusion into the serous cavities cannot be detected at these times, and it is doubtful whether any exists, as its amount, even in the last stages attended by enormous subcutaneous

swelling, is relatively small. It does not appear in the feet and ankle till late in the disease, when the dropsy is quite general.

HOFFMAN speaks of local areas of œdema on the trunk. This I have never seen, nor is it noted by any other observer. A rapid increase of the œdema is always indicative of danger. Its character is much the same as is observed in renal affections, though albumen is never found in the urine. In Case 2 the swelling appeared relatively greater above the diaphragm, and that of the sides of the neck was much exaggerated, though this latter was chiefly due to dilatation of the veins. The connective tissue of the lungs being likewise engorged with serum, respiration is impaired, imperfect aeration of the blood follows, and death, chiefly from asphyxia. The primary cause of the dropsy is a watery condition of the blood. The causes which give rise to the escape of its serum through the capillaries into the surrounding tissues are doubtless various. As vaso-motor paralysis is an important condition, especially in the wet form of beriberi, this plays an important part in the exosmosis of the fluid portion of the blood. The most important rôle in this phenomenon, is however, I believe played by the dilated heart through the mechanism before described.

MASKED, ANOMALOUS, AND COMPLICATED FORMS OF BERIBERI

From the striking resemblance already shown to exist between the mode of action of the materies morbi of beriberi and that of malarial affections, a somewhat wide range of masked, anomalous and complicated forms of the former would seem almost of necessity to occur.

a *Masked Beriberi*

In the localities and seasons of the prevalence of beriberi, many cases furnishing obscure symptoms of a nervous character are constantly met with, especially those giving evidence of vaso-motor nerve disturbance, which no doubt are due to the influence of the beriberi miasm. Unfortunately, we have not, as in masked or doubtful malarial affections, a specific drug by means of which uncertainties of this kind may be cleared up. Our only course in these cases is to await the development of one or more symptoms characteristic of the disease. As a rule, no one symptom occurs alone, but a group of them, in nearly equal degrees of severity. I have observed that during the prevalence of beriberi many patients complain of pains in the pectoral muscles and of chest oppression when no other symptoms of the disease can be made out. I am quite certain that these are masked cases of beriberi, as I have not unfrequently seen them, later on, develop other symptoms, which left no doubt as to their nature. Further investigation will doubtless lead to the discovery of other masked forms of this disease.

b *Anomalous Cases*

Anomalous cases, or those presenting marked deviations in type, are by no means uncommon, and often very puzzling to even those who have had large experience of the disease. Thus, I have at the present time a patient in hospital whose only symptom for a

time was anæsthesia affecting the skin of nearly the entire body. On careful inquiry it was found that its first appearance was on the areas of its primary manifestations in typical cases, from which it had radiated to surrounding parts. A little later the characteristic paralysis of the extremities made its appearance, which, coupled with the fact that the patient had suffered from a severe attack of beriberi the previous season, left no longer room for doubt as to the nature of the disease with which I had to do. In others, muscular tenderness is found to be the most pronounced symptom. Such a case came under my observation last year. The subject was a student of this hospital. Having missed him for a few days, I went to his lodgings to ascertain the cause, and found him in bed, unable to move a muscle without great pain, which he attributed to articular rheumatism. I soon found out, however, that the trouble was not in the joints, but in the muscles, which accounted for the pain experienced when motion was attempted. This symptom bore no relation to the others characteristic of the disease. A brisk purgation for a couple of days so improved his condition that he was able to walk, and a week later he renewed his attendance at the hospital.

In a few instances I have seen death follow quickly on the first symptoms of invasion apparently from the overwhelming effects of the poison on the nerves supplying the heart. In these cases the usual mode of death from œdema of the lungs is probably supplanted by pulmonary embolism, a not unfrequent cause of death, mentioned by Indian observers.

c Complications with other Diseases

Those with which I have found beriberi most frequently complicated are diarrhoea, dysentery, continued and marsh malarial fevers.

Diarrhoea—When this is the complicating disease, it usually appears a day or two in advance of any well-marked symptoms of beriberi. It often happens that the discharges from the bowels, which are profuse and watery, cease within 24 or 36 hours, without treatment, when the patient finds himself unable to stand or walk. The diarrhoea often returns, exhausting the patient and hastening a fatal termination.

Dysentery—This I have seen in but two cases, both of which terminated fatally. Dr WHEELER, who was for a time in charge of the Imperial Naval Hospital in Tokio, informs me that he saw quite a number of cases of this complication. Doubtless the reason I have not met with more of them is that dysentery is comparatively rare in Yokohama.

Marsh Malarial Fevers—Notwithstanding the strong resemblance which exists between the modes of production of these two forms of disease, their admixture is uncommon. They have a certain resemblance in their initial stages which is very puzzling, and though we may be able to diagnose with certainty beriberi or malarial poison as the cause of the indisposition, nothing but the administration of quinine will for some days enable us to decide which it is. Should it turn out to be a mixed one, this treatment will eliminate the malarial element and leave the beriberi to run its course, but in no way modify it. This alone goes to prove what has been already stated in regard to the distinct nature of the two poisons.

Case 6 illustrates the peculiarities of this admixture, and precludes any necessity for its description here.

Typhoid Fever—This complication is very frequent and offers one of the most interesting studies in the diseases of this country. It is often difficult, and even impossible, to determine which is the primary invading affection, especially if the patient is late in coming under observation. I have seen cases wherein a patient, after having for some time suffered from beriberi, was attacked with typical typhoid fever, which ran its course and left the primary affection more or less modified in form, but still holding the subject within its grasp. On the other hand, and quite as frequently, I have seen the first symptoms of beriberi appear after the fever had fully become established. Whether the fever or the beriberi be the first to appear the union of the two justifies an unfavourable prognosis, due mainly to the fact that degenerative changes in the muscular tissue of the heart accompany both, and hence early failure of that organ. When beriberi is first to invade, we have a good diagnostic sign of a complicating specific fever in the temperature, which usually remains normal, or falls below normal in simple cases of the former. The diagnosis is less easy when the fever is the first to invade, in which case the beriberi element is often not detected. 1st, because the patient is prostrate in bed, when the paralysis is overlooked, 2nd, because the dulness of his perceptions renders him unable to appreciate the anesthesia or to describe the chest oppression and palpitation, which are characteristic symptoms of beriberi. Signs of pain caused by firm pressure on the calves, even when the patient is in a semi-unconscious state, generally serve to excite suspicion as to the mixed nature of the disease. An examination of the circulatory system usually throws still more light on the case. The pulse is found wanting in tone, and heart and aortic murmurs are more or less pronounced. Intercoastal pulsation in the cardiac region will also be seen in the majority of cases. The pain produced by pressure on the abdominal muscles, which is also often present, is calculated to mislead the observer when searching after the symptoms of typhoid fever, its existence, however, in the left as well as the right iliac region will leave no longer room for doubt as to its independence of intestinal lesions. At the same time it adds to the difficulty of diagnosing a typhoid fever complication, as on several occasions I have seen, for the same reason, simple fever mistaken for typhoid when the case was one of the former and beriberi. The paralysis of the anterior tibial muscles, so characteristic of beriberi, is easily recognised in complicated cases, even when the patient is confined to his bed, by the peculiar drooping of the foot, most marked when lying on the back, and is a diagnostic sign of great value. In the early stages of fever complications with beriberi, the thermometer is often our only means of recognising the fact.

Should the patient survive a mixture of a specific fever and beriberi, especially the dry form, recovery is pretty sure to be tedious, as, whichever may have been the first to invade, the beriberi element will remain, if not active, at least as a sequence in the form of extreme muscular atrophy and paralysis of the extremities. Though this condition is sometimes met with as a sequence of uncomplicated typhoid it is impossible to mistake a simple case of this disease for one complicated with beriberi.

An illustration of the behaviour of a case of mixed beriberi and typhoid fever, and the peculiarities of its course, will be found in Case 7. Mixed beriberi and simple continued fever, of which I have seen a number of cases, offers little for especial observation beyond what has been noted when typhoid fever is the complicating element, except that a much more favourable

prognosis is warranted. The gravity in either case is much greater in the wet than in the dry form of the malady.

PREVALENCE OF BERIBERI WITHIN THE EMPIRE OF JAPAN

In Japan beriberi is confined almost entirely to the seaboard towns on the eastern and southern coasts especially since the congregation in them of sailors, soldiers, and students. The inland city of Kyoto and the seaport of Kagoshima are apparent exceptions to this rule, as the disease is more or less prevalent in the former, and to but a very small extent, if at all, in Kagoshima, though the latter occupies the most southern extremity of the Japanese group of islands, where climate would appear to favour the development of the disease. Hakodadi, on the other hand, in the island of Yesso, the most northerly of the group forming the empire, suffers severely. The climate here is that of the northern temperate zone of America, hence the theory that this disease is one of warm latitudes only, falls to the ground.

Judging, then, by the geographical range of beriberi in Japan, it is not the degree of heat that determines its prevalence so much as that of atmospheric humidity, which is very great on the southern and eastern sides of the archipelago, while the northern and western shores, which are comparatively exempt from the disease, have a dry atmosphere. I am disposed to believe that the same condition of prevalence or non-prevalence of beriberi in other localities where it exists will be found to admit of the same explanation.

The influence of the season of the year, and of unusual rains, has already been sufficiently considered. But an explanation is still wanting for the epidemic appearance of the disease from time to time. None the less so for epidemic outbursts of malarial affections, which are well known to occur without any recognisable causes other than those always present.

Of the relative endemic or epidemic prevalence of beriberi among the civil population of a given locality in a given time, it is impossible to form an estimate with our present means of obtaining statistical information. The army and navy reports furnish some very reliable and interesting statistics on this subject, by which it will be seen that soldiers and sailors are especially liable to the disease. Thus the military and naval hospitals of Tokio show, in their reports for 1875, that the admissions for beriberi were 660, or 3.8 per cent of the whole force of 17,000. Besides these cases, a large number of men were invalided as suffering from the disease, but from the mildness of the symptoms were not sent to the hospital.

DIAGNOSIS OF BERIBERI

Making all due allowance for the greater prevalence of anæmia and debility from various causes in hot climates, it is difficult to understand how such a variety of opinions as I have already quoted could be held by so many medical men in regard to the nature of a specific disease like beriberi, in other words, how they could fail to make a diagnosis between it and the various other affections mentioned. It is evident that either their opportunities for observation were limited, or that they had very imperfect notions of its symptoms and pathology. With our present knowledge of the disease, such errors would be inexcusable, especially in those localities where it continually prevails. No small degree of experience, however, is needed to recognise it in its earlier stages, or when complicated with other maladies.

Those affections with which beriberi is most frequently confounded are organic diseases of the heart, dropsies, paralyses and muscular atrophies, scurvy and leprosy. The following list of differential characters will serve to simplify the question in the majority of cases where any doubt exists on the subject. Beriberi is distinguished —

a *From Organic Diseases of the Heart* —By the transient character of the murmur, and then location of greatest intensity over the pulmonary valves

b *From Dropsies*, dependent on diseases of the heart, kidneys, or liver, or on cachexias —By the late appearance of anasarca in the feet, and the relatively small amount of ascites, the absence of albumen in the urine, the general diffusion of the swelling and the small amount of peritoneal effusion, and by the absence of anæmia except late in the disease

c *From various Forms of Paralysis and Muscular Atrophy*, dependent on acute or chronic inflammation of the brain or cord, and then meningitis, tumours, strychnia, or on progressive muscular atrophy, or on muscular atrophy from the above causes —By the absence of pain, fever and convulsions, general freedom of motion of the limbs from side to side, control over sphincters, and absence of bed sores, by paralysis and atrophy always appearing first in the lower extremities, and symmetrically, and by the rapid and, in nearly all cases, complete restoration of the volume and function of muscles affected

d *From Anaesthesia*, dependent on leprosy, which occurs in rounded, circumscribed spots on various parts of the body, and is from the first most marked on the soles of the feet —By its symmetrical distribution and regularly progressive course, and by its never commencing on the soles of the feet

e *From Skin Abnormalities*, dependent on leprosy —By absence of clubbing of the fingers and toes, bullæ, ulcerations, etc., and by there being no discolouration of the skin, or tubercular tendency

f *From Scurvy* —By absence of buccal factor, and of petechiæ and other blood extravasations

PROGNOSIS AND MORTALITY

The *Prognosis* in uncomplicated beriberi is favourable in the majority of cases. In seasons of epidemic prevalence all cases of the wet form must be carefully watched, as it not unfrequently happens that grave symptoms suddenly appear at a time when no danger has been anticipated. An unfavourable prognosis may be ventured when relief is not obtained by free purging, or when vomiting has set in. In the dry form the termination by death is exceedingly rare, and the time when recovery shall take place depends on the degree of atrophy and muscular paralysis present. Appropriate treatment shortens this time, by an arrest of the degenerative changes going on in the special groups of muscles affected. In most cases the reaction of regeneration restores their functions so completely as to leave little or no evidence of the disease.

It is a question of no little importance how far the heart regains its normal condition after having suffered from degenerative changes, as unquestionably it does in many cases of the dry as well as of the wet form of the disease, though no opportunity has been had of verifying this assertion by a postmortem examination. Repeated physical examinations of the heart after more or less complete restoration of the voluntary muscles has taken place, enable me to state with a good deal of certainty that in many cases it is smaller and weaker than normal, though, without doubt, the regenerative force so remarkably exhibited in the same tissue elsewhere does much to correct the injury it may have sustained.

Mortality—The exact ratio of mortality in a given number of cases of beriberi cannot be estimated in civil life, because of the incompleteness, and even total absence in many localities, of mortuary returns. In years of great severity of the disease, showing, necessarily, a greater intensity of the poison, the death rate is higher than when the number of cases justifies the term endemic only to be used in regard to it. There can be no doubt that the mortality is much less among the acclimatised than among those who from any cause take up their residence temporarily in the localities of the prevalence of the disease. As soldiers and sailors belong mainly to the latter class, some allowance must be made for the high rate of mortality shown by the naval and military reports. Thus, out of 402 cases of beriberi treated in the Military Hospital of Tokio in 1875, 89, or 22·13 per cent, were fatal. In the Naval Hospital in the same city, out of 590 cases treated for this disease from 1874 to 1878 inclusive, the death rate was 5·8 per cent. The army returns for the whole of Japan for 1875, a fairly average year, show a mortality of 17·65 per cent of the cases treated in hospitals. Of the 218 cases admitted into the Police Hospital in Yokohama in 1871 (whole force 500), 11 only were fatal, about 5 per cent. Some authors put the rate of mortality from beriberi in India at from 14 to 36 per cent, and in southern Brazil it is said to have reached 25 per cent.

PATHOLOGICAL ANATOMY

Considering the large opportunities enjoyed by the Indian medical men, it appears somewhat remarkable that so little has been furnished by them towards the pathological anatomy of beriberi. Excepting the postmortem examinations described in the essays of PRAEGLER and ANDERSON, I find nowhere in the literature of the malady within my reach more than meagre and disconnected statements of the anatomical changes observed. Great allowance must be made for the difficulty experienced in obtaining autopsies of natives throughout all these Eastern countries, due mainly to religion, custom and tradition. In two cases only have I succeeded in this much-desired object. Other observers of the disease in this country have not been more fortunate in this respect than myself. Dr ANDERSON, out of 60 deaths in his recorded cases, obtained one autopsy, and Drs ELDRIDGE and BERRY obtained two.

The following is a summary of the postmortem appearances furnished by my two cases (1 and 2, already detailed) supplemented from all other available sources.

General Aspect of the Cadaver—Ecchymosed, purplish, or with patches from the size of the finger-nail to that of the hand over the whole body (ANDERSON). All the muscles well nourished and largely developed (ANDERSON). Rigor mortis wanting (PRAEGER). Connective tissue engorged with serum.

Thorax—Lungs oedematous, bronchial tubes and air cells containing a frothy serous fluid (ANDERSON). Pleural cavities contain considerable quantities of serous fluid, as noted by most observers. Pericardium contains serous fluid, also noted by most observers. Heart large and flabby, cavities dilated, especially on the right side. Muscular tissue pale yellow in colour, and softened, valves normal (PRAEGER). This is the testimony of nearly all observers. ANDERSON, however, states that in his case the muscular tissue of the heart was firm and healthy, and accounts in general for apparent degeneration of the cardiac muscular fibres by assuming the

accidental coexistence of some defect of nutrition. Auricles and ventricles engorged with blood, especially on the right side, antemortem clots in Case 1 extending through the pulmonary valves, with emboli blocking up a number of the secondary branches of the pulmonary artery (Not improbable that death may be due to embolism—ARTKLN) Microscopic examination of the heart muscle in both my cases showed granular degeneration (not elsewhere noted)

Blood vessels—The whole venous system enormously enlarged and engorged with blood, some of the larger divisions containing firm clots. Nothing abnormal observed in the arteries

Abdomen—Intestines exceedingly transparent and of a bright pinkish hue, from capillary congestion (congestion in the form of arborescence—PRAEGER, mucous surfaces congested and divested of epithelium throughout their whole extent—ANDERSON) Cavity of the peritoneum free from adhesions, containing clear fluid. Many observers make mention of serous fluid occurring in all the serous cavities. In neither of my cases did the liver present marked abnormality. It is usually described by authors as voluminous and filled with dark blood, but this may perhaps be due to the fact that the subjects were inhabitants of tropical and malarious climates. The spleen presented no abnormality. Authorities speak of this organ as generally large or hypertrophied, very often soft, and filled with black blood. The same reasons may be advanced for this as for the similar condition observed in the liver. The kidneys were normal in appearance, size and consistence. Other observers describe enlargement and softening. DAVYMAN states that grave cases give indications of Bright's disease, and BAUER found in them granular exudations(?) and a partial fatty transformation of the epithelial cells of the tubules and glomeruli. In Case 1 I found what I at first supposed to be this condition, but when the specimens were left in glycerine for a few hours, the appearance was lost. I concluded, consequently, that it was due to pigment only.

The *Muscles* are somewhat wanting in firmness, yet preserve their normal size. Colour a little paler than usual. Microscopic examination of specimens from Case 1 was missed through the carelessness of an assistant. The paralysed muscles from Case 2 were examined with great care. All had suffered commencing degenerative changes, though in some instances these had not passed the stage of simple indistinctness of the striations. In the dry form when muscular atrophy and paralysis are often extreme, degenerative changes are far more pronounced. As beriberi atrophica is very rarely fatal, study of the muscular tissue, if pursued at all, must be from specimens obtained by the harpoon or otherwise on the living subject. These I have succeeded in obtaining in a number of instances. Case 3, which was remarkable not only for extreme atrophy of the muscles of the extremities, but for their complete restoration, exhibited all the phases of muscular degeneration, viz., first, augmentation in the volume of a certain number of the primitive fibres, then obliteration of their striations, and, subsequently, vitreous transformation of their sarcomeric elements. Some observers have found the muscles in a condition of fatty degeneration, others remark that the tissue often presents the appearance of having been macerated.

Nervous System—So many clinical symptoms point to a nervous origin that authors have usually given the morbid anatomy of this tissue considerable attention. The following is a brief summary of previously reported observations as well as of my own.

Extravasations of blood have been found on the outer surface of the spinal dura mater in the cervical region. There is a general agreement as to the congestion of the spinal membranes, and the presence of fluid within the canal. The arachnoid has been described as undergoing fatty transformation, and the pia mater as cloudy. Softening has been observed in all three regions of the cord, the lumbar portion and cauda equina being the least frequently affected. In the neighbourhood of the softening the fibres and cells are filled with corpora amylacea. The cord may also be altered by minute effusions of fluid into its substance or by coagulation within its vessels. But outside the distinctly affected regions the microscopical appearances betray no abnormality. The cerebral membranes are sometimes, but not always congested, and there may or may not be effusion beneath them or into the ventricles. The cortex may be normal in appearance or slightly congested. The brain is firm on section and is not softened. On microscopical examination no change is found in the tissue, but the capillary vessels are unusually distinct though empty, and collapsed in a very irregular manner as after great over-distension. Solar plexus and semilunar ganglia apparently healthy. Nerve trunks of limbs normal. Dr ANDERSON remarks that microscopic examination of the various tissues showed a complete absence of textural lesion.

TREATMENT OF BERIBERI

From the manifest influence which locality has on the production of the disease, its treatment must be divided into hygienic and medical.

Of the hygienic treatment, the most important, as has already been demonstrated in the chapter on etiology, is removal from the influence of the poison. It is manifestly the duty of the physician, therefore, in all cases to advise this measure, of course, the sooner this is done the more certainly a favourable result may be expected.

If early in the season, and the number of cases be few, the sufferer with the dry form of the disease may safely defer a removal for some weeks, or perhaps months. If, on the contrary, warm weather has already set in, and the disease is epidemic, and the characteristic symptoms of the wet form have declared themselves, or if in any given case a sudden exaggeration of symptoms takes place, no time is to be lost in removing the patient to a safe distance from the locality where the disease was contracted. From the frequently limited area of prevalence of beriberi, this may be but a few miles. The influence of a high temperature on the malady renders it advisable to ascend mountains, thereby moreover securing greater purity of air. The importance of this can only be realised by those who have seen cases where no immediate danger was apprehended suddenly become too ill to be moved, and in a few hours terminate fatally, in spite of all the means at our command. In the dry form of the disease this rarely occurs, though a scarcely less disastrous result may follow in the shape of complete paralysis of the extremities, which may require months to overcome by the best-directed treatment. It is evident from this that to admit a patient suffering with beriberi to a hospital located within a region of its prevalence is culpable in the extreme, so also is it clear that to establish a hospital for the treatment of this disease in such a place is a mistake for which no apology can be made. On general principles, the same may be said of teaching institutions for students.

from the country. A normal school was so placed in this district, and 50 per cent of the whole number of scholars were invalided for beriberi alone in one season. Though the influence of crowding in dormitories, barracks, and low, damp localities within beriberi districts is, according to my view, but a predisposing cause, the removal of patients to well ventilated, airy apartments on high, dry ground is a valuable hygienic measure which naturally suggests itself, yet it would appear at times to have but little influence in arresting the progress of the disease.

Diet—The proper regulation of food is a hygienic measure of undoubted value. At the head of the list of articles to be avoided is rice. This alone has been charged with being the exciting cause of the disease in countries where it prevails most, principally for the reason that, so far as yet known, it forms the chief article of food consumed by the great mass of the population. How or in what manner it acts deleteriously I am unable to explain, except that it is less digestible and more constipating than the coarser cereals in use. It is possible that this may depend in some degree upon the manner in which rice is prepared, viz, by entirely depriving it of its outer skin or hull—the universal custom in this country. Be this as it may, when barley, wheat or beans are substituted in the diet of patients, an amelioration may be confidently expected. Though this is most marked in the earlier stages and the milder forms it is none the less a fact that, as long as any food can be taken at all, rice is badly borne. Wheat, barley and beans (especially a small red variety called *adzuke*) are mentioned, because these are used as a substitute for rice by the people themselves. Better assimilation, and a slight laxative effect follow the ingestion of these substances. Especially is this to be said of the little red bean referred to, which moreover excites the secretion of the kidneys. Hence it is that often the only treatment adopted by the people is an exclusive use of this bean as food, and, it must be added, with quite satisfactory results in many cases. Impressed with the value of this auxiliary, I invariably request my patients to use it as the principal article of diet. In mild cases it is only necessary to advise the admixture of the bean with rice. As far as I am able to judge, the virtue of the *adzuke* bean is chiefly in the hull, which has suggested to me the practicability of making an extract or infusion of it for therapeutic use.

Medical Treatment—No drug has been discovered possessing specific properties in this disease. In the wet form treatment consists in the administration of medicines calculated to draw off the excess of serum in the areolar tissue and serous cavities. First in point of efficacy to this end are the hydragogue cathartics. On account of cheapness, efficacy, and because well borne by the stomach, sulphate of magnesia has been most employed by myself. In mild cases, from 1 to 2 oz daily suffices. When symptoms are urgent, nothing short of from four to six large watery stools will make much impression, and to obtain these 3 oz a day, largely diluted, may be found necessary. The sense of relief following this method of depletion is often very remarkable. I was first made aware of this in a case where 4 oz was taken at once by a patient, instead of in two days as directed. A decided impression having once been made, smaller doses at longer intervals often keep the patient comfortable, and in many cases give a decided check to the disease, to be followed by recovery. In the later and severer stages the stomach becomes irritable, causing the rejection of water or the simplest drinks, much more large saline draughts. The Japanese term this condition *shiyoshin*, the word conveying the idea that the disease has centred in the chest. Elateium and that class of cathartics must now come promptly into play.

if the patient is to gain anything by depletion, care being very necessary that he is not depressed dangerously by their violent action. It is under these circumstances that Dr ANDERSON strongly recommends large and repeated bleedings. Should this urgent condition be thus relieved, the physician must be prepared to see it return in a few days, or perhaps hours,—and again bleed. After two or three such paroxysms the patient may either recover, or sink into complete exhaustion. As death usually occurs through failure of the heart, combined with oedema of the lungs, the treatment by cathartics, to be effectual, must be begun early, though the rapidity with which extreme hydiæmia sets in, in some cases, precludes its successful application. The almost specific virtue claimed for *trecal farool* by Indian physicians is without doubt due to its cathartic properties. I am of the opinion that any other compound producing three or four loose stools would be equally effective. Diuretics are indicated for the same reason as cathartics. A mixture of nitrate and acetate of potash, half a diachm of the former to one diachm of the latter daily, is a favourite prescription with me to excite the action of the kidneys. In mild cases, the acetate alone not only acts well, but is less objectionable for prolonged use than when combined with the nitrate. Jaborandi or pilocarpin has been used in a few cases, but, so far as I can learn, with indifferent success. I have not had any experience with the drug, fearing its depressing action on the heart, and bearing in mind that this organ, in most cases, is weak and strained to the utmost.

Muscular hyperæsthesia and paralysis are common to both forms of the disease. In the wet form, especially in its subacute stage, both the hyperæsthesia and paralysis improve under the depletory treatment by cathartics and diuretics. In the dry form this mode of treatment exerts no beneficial influence, but tends rather to aggravate the symptoms, while tonics are beneficial. For the muscular hyperæsthesia, aconite is a remedy of much potency, and is very highly lauded by Dr ANDERSON. The native physicians, for many years, have also used it extensively. There appears to be no remedy which exerts any favourable influence over the paralysis during the acute stage, or while the patient is exposed to the specific beriberi poison.

Muscular atrophy and paralysis, as sequences of the morbid processes peculiar to dry beriberi, are amenable to stychnia, electricity, frictions, and the remedies usually employed when these states are due to other causes. These measures are contra-indicated so long as any considerable degree of hyperæsthesia of the muscles exists.

The treatment of cases complicated with continued and malarial fevers is dependent upon the circumstances of each case. Special medication of the beriberi element is usually impossible. An early removal of the patient beyond the influence of the poison is the best means of treatment. Complicating fevers demand their own individual consideration; thus, malarial fever demands quinine, in all cases stimulants being needed to support the heart and circulatory system.

I beg to acknowledge with gratitude the assistance rendered me by Dr C. A. SIEGFRIED, Passed Assistant Surgeon, USN, in preparing the MS. of the above monograph.

CHINA.

IMPERIAL MARITIME CUSTOMS.

II.—SPECIAL SERIES: No. 2.

MEDICAL REPORTS,

FOR THE HALF-YEAR ENDED 30TH SEPTEMBER 1880.

20th Issue.

PUBLISHED BY ORDER OF
The Inspector General of Customs.

SHANGHAI
STATISTICAL DEPARTMENT,
OF THE
INSPECTORATE GENERAL

MDCCCLXXXI.

INSPECTOR GENERAL'S Circular No 19 of 1870

INSPECTORATE GENERAL OF CUSTOMS,
PEKING, 31st December 1870

SIR,

1—It has been suggested to me that it would be well to take advantage of the circumstances in which the Customs Establishment is placed, to procure information with regard to disease amongst foreigners and natives in China, and I have, in consequence, come to the resolution of publishing half-yearly in collected form all that may be obtainable. If carried out to the extent hoped for, the scheme may prove highly useful to the medical profession both in China and at home, and to the public generally. I therefore look with confidence to the co-operation of the Customs Medical Officer at your port, and rely on his assisting me in this matter by framing a half-yearly report containing the result of his observations at upon the local peculiarities of disease, and upon diseases rarely or never encountered out of China. The facts brought forward and the opinions expressed will be arranged and published either with or without the name of the physician responsible for them, just as he may desire.

2—The suggestions of the Customs Medical Officers at the various ports as to the points which it would be well to have especially elucidated, will be of great value in the framing of a form which will save trouble to those members of the Medical profession, whether connected with the Customs or not, who will join in carrying out the plan proposed. Meanwhile I would particularly invite attention to—

a—The general health of during the period reported on, the death rate amongst foreigners, and, as far as possible, a classification of the causes of death.

b—Diseases prevalent at

c—General type of disease, peculiarities and complications encountered, special treatment demanded.

d—Relation of disease to $\left\{ \begin{array}{l} \text{Season} \\ \text{Alteration in local conditions—such as drainage, \&c} \\ \text{Alteration in climatic conditions} \end{array} \right.$

e—Peculiar diseases, especially leprosy.

f—Epidemics $\left\{ \begin{array}{l} \text{Absence or presence} \\ \text{Causes} \\ \text{Course and treatment} \\ \text{Fatality} \end{array} \right.$

Other points, of a general or special kind, will naturally suggest themselves to medical men, what I have above called attention to will serve to fix the general scope of the undertaking. I have committed to Dr ALEX JAMIESON, of Shanghai, the charge of arranging the Reports for publication, so that they may be made available in a convenient form.

3 —Considering the number of places at which the Customs Inspectorate has established offices, the thousands of miles north and south and east and west over which these offices are scattered, the varieties of climate, and the peculiar conditions to which, under such different circumstances, life and health are subjected, I believe the Inspectorate, aided by its Medical Officers, can do good service in the general interest in the direction indicated, and, as already stated, I rely with confidence on the support and assistance of the Medical Officers at each port in the furtherance and perfecting of this scheme. You will hand a copy of this Circular to Di _____, and request him, in my name, to hand to you in future, for transmission to myself, half-yearly Reports of the kind required, for the half-years ending 31st March and 30th September—that is, for the Winter and Summer seasons

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I am, &c ,

(signed)

ROBERT HART,

I G

THE COMMISSIONERS OF CUSTOMS,—*Newchuang, Ningpo,*
Tientsin, Foochow,
Chefoo, Tamsui,
Hankow, Takou,
Kuikiang, Amoy,
Chankiang, Swatow, and
Shanghai, Canton

SHANGHAI, 10th March 1881

SIR,

IN accordance with the directions of your Despatch No 6 A (Returns Series) of the 24th June 1871, I now forward to the Statistical Department of the Inspectorate General of Customs, the following documents —

- A* —Report on the Health of Amoy for the half-year ended 30th September 1880, p 1
- B* —Notes on an Epidemic of Continued Fever, by Dr MANSON, pp 2-9
- C* —Note on Distoma Ringeni, by Dr MANSON, pp 10-12
- D* —Additional Notes on Filaria Sanguinis Hominis and Filaria Disease, by Dr MANSON, pp 13-15
- E* —Report on the Health of Tamsui and Kelung for the year ended 30th September 1880, pp 16, 17
- F* —Report on the Health of Ichang, pp 18-21
- G* —Report on the Health of Wuhu for the half-year ended 30th September 1880, pp 22, 23
- H* —Report on the Health of Swatow for the half-year ended 30th September 1880, pp 24-26
- I* —Report on the Health of Ningpo for the eighteen months ended 30th September 1880, pp 27-31
- K* —Report on the Health of Shanghai for the half-year ended 30th September 1880, pp 32-39

I have the honour to be,

SIR,

Your obedient Servant,

R ALEX JAMIESON

THE INSPECTOR GENERAL OF CUSTOMS,
PEKING

The Contributors to this Volume are—

P MANSON, M D , CH M	Amoy.
B S RINGER, M R C S , L S A	Tamsui and Kelung
E P McFARLANE, L F P & S G	Ichang
A S DEANE, L K & Q C P	Wuhu
E I SCOTT, L K & Q C P , L R C S I	Swatow
W A HENDERSON, L F P & S G	Ningpo
R A JAMIESON, M A , M D , M R C S	Shanghai

For the footnote on page 12, the Compiler is responsible

A — Dr P MANSON'S Report on the Health of Amoy for the Half-year
ended 30th September 1880

FROM the 23rd November 1879 till the 20th July 1880 there was no death in the foreign community, from the latter date till the end of September there have been seven deaths. With the exception of an epidemic of fever, the general health, as far as climatic disease of local origin is concerned, has been fairly good.

The following were the causes of the deaths I allude to —

1 An infant	Inanition, prematurely born
2 Shipmaster	Multiple abscesses of the liver
3 Eurasian	Brain disease, hemiplegia
4 Resident	Acute dysentery
5 „	Intermittent fever, enlarged liver, syncope
6 „	Drowning
7 Sulu	Concussion of the brain, wound of lungs from fractured ribs, accident

The case of liver abscess ran a very rapid course. The postmortem examination discovered 14 abscesses, varying in size from two to eight ounces, occupying nearly the entire liver. The abscesses appear to have been secondary to superficial but extensive ulceration of the ascending colon. During life the diagnosis of multiple abscess was made by the aid of the aspirator, and symptoms of ulceration of the great intestine were carefully inquired after, but beyond a history of irregular diarrhoea some time previous to the development of liver symptoms, I could elicit no positive indication of dysenteric or other ulceration of the bowel.

The fatal case of dysentery ran its course in 10 days. Ipecacuanha was given in large and frequently repeated doses, and for the most part was retained, twice the acute symptoms appeared to be arrested by it, but gangrene of the intestine set in and proved rapidly fatal. The drug was given within 24 hours of the first appearance of dysenteric symptoms, and in full doses. I am glad to say I have but seldom seen it fail so decidedly.

B—Epidemic of Continued Fever

By PATRICK MANSON, M D

I HAD an opportunity this summer of observing an epidemic of continued fever of a somewhat anomalous character. As it illustrates admirably the difficulty we meet with in classifying the fevers of tropical countries, I am induced to give the following brief sketch of the cases that came under my notice.

The epidemic was of a very circumscribed character, as far as I could ascertain, among the Chinese, but out of the small number of foreigners residing on Kulangsu, six were attacked. Undoubtedly many more Chinese had the disease than those whose cases passed under my own observation—six in number,—but with them the malady seemed to be limited to a particular group of houses, there was nothing like a general epidemic.

The group of houses I refer to, and from which all the Chinese cases came, is situated at the foot of a hill, and on the margin of a string of paddy fields. There are many wells along the margin of the paddy land, and as they lie low, without any particular appliance to keep out surface water, these wells must be filled with garbage after every shower of rain. They supply water to several washermen, and probably eke out the yield of milk from the many buffaloes stabled near them, and from which part of the milk supply of foreigners comes. Preceding the outbreak of the epidemic among foreigners we had some very rainy weather, and it is a curious circumstance that all the foreigners affected obtained their milk from milkmen living in the vicinity of these wells. The greater part of the foreign community is supplied from another dairy, situated some distance from any Chinese house, and about a mile away from the focus of the epidemic. I mention this fact about the milk supply as significant, but do not necessarily associate it with the sickness among foreigners as cause and effect. The following is a brief sketch of the cases that came under observation. I number them (arbitrarily) for the sake of reference.

1. On 23rd May a Chinese lad, about 18 years of age, was admitted to the Chinese Hospital with symptoms resembling typhoid fever. He had high fever, furred tongue, low delirium, a stupid, drunken countenance, diarrhoea, and abdominal tenderness. He took large doses of quinine for a time, but, not improving, all drugs were put aside, and careful and diligent feeding substituted. He was well enough to leave hospital on 28th June, but he had been very ill, was wasted to a shadow, and had lost the vision of one eye from sloughing of the cornea setting in towards the end of his fever. On inquiry I learned that his illness began about the 28th of April with shivering, followed by fever, and that he was not brought to hospital till he had become delirious. I put the case down at the time as typhoid fever.

2. This lad's father was in hospital from 23rd April to 3rd May with a milder attack of apparently the same disease. He was ill about a month before he applied for admission.

3. His mother was laid up from 4th April to 3rd May with what was described as quotidian ague. I did not see her.

4 A girl about 17 years of age, a pupil in one of the mission schools, came to live during the summer holidays in a house near that from which the three preceding cases came. She left school about the end of July. On 15th August she got up in the morning feeling giddy, at 8 A.M. she had a smart rigor, rapidly followed by high fever and delirium. She continued in this state till the morning of the 18th, when her friends brought her to the hospital. She was moribund on admission, and died within an hour.

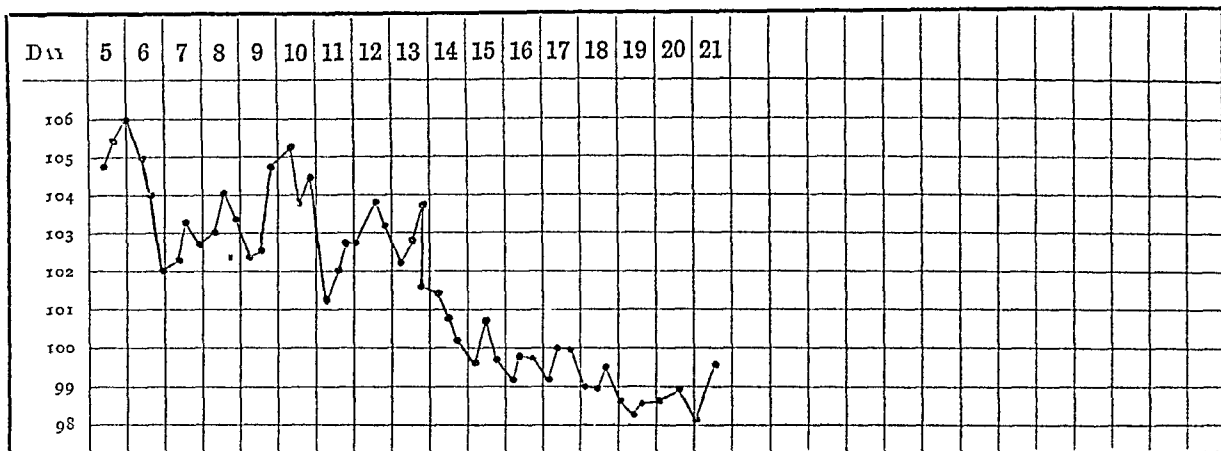
5 Her little brother, who slept in the same bed with her, began to be ill on 16th August. He came with his sister to hospital on the 18th. I saw him shortly after admission, he had smart fever, and could keep nothing on his stomach. He got a subcutaneous injection of quinine at once. This was repeated on the 19th, 20th, and 21st, on the 22nd he was well and left for his home.

6 About the end of May I was called to see a lad, the servant of Mr A (7), ill with fever. He lived in Mr A's house till his fever began, but when I first saw him he had been removed to a Chinese house close by. He had been ill for about a week, his only symptoms being fever and frequent and profuse epistaxis. He had no diarrhoea. Supposing the case to be one of remittent fever, I ordered several large doses of quinine. Next day he appeared better, and I handed the case over to a native assistant. Hearing nothing about him for some time, I concluded he had recovered, but towards the end of June I was informed by the assistant that he was no better and that his temperature was permanently over 105° , and often as high as 106° . I had him removed to the Seamen's Hospital, and made a careful examination. He was very much wasted, had a dry, harsh skin, a slightly furred tongue, and the high temperature above mentioned; but he had no delirium, diarrhoea, abdominal tenderness, petechiæ, nor any visceral disease I could make out. He took quinine in very large and frequently repeated doses. The temperature fell rapidly, but it took weeks to reach the normal standard, any remission in the use of quinine being immediately followed by an increase of fever. Altogether he was ill about two months, and apparently owed his recovery to the constant drugging with quinine. He is now quite well.

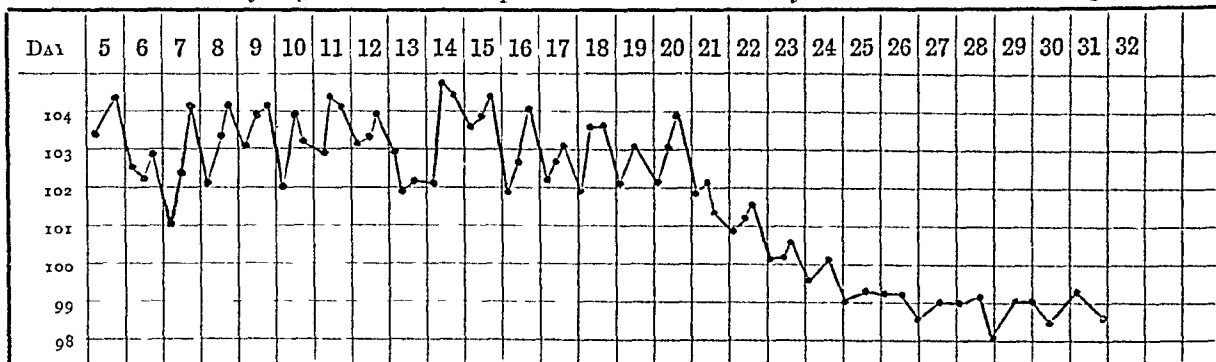
These are all the Chinese cases of which I had personal cognizance. At the time there was no general epidemic of fever among the natives. The usual autumnal epidemic of malarial fevers, which is at present very severe, did not begin till the middle or end of September.

7 Mr A's was one of the first cases of fever amongst foreigners. He was taken ill about the 10th June, with attacks of feverishness coming on every afternoon, preceded by slight feelings of chilliness, and followed during the evening and night by considerable sweating. He was always pretty well during the morning, and was able to move about till 2 P.M. Although cinchonised frequently, his fever continued for a fortnight, and did not leave him till he was sent on a voyage to Tamsui. He improved as soon as he got to sea, but on his return to Amoy had a slight relapse. He had no diarrhoea.

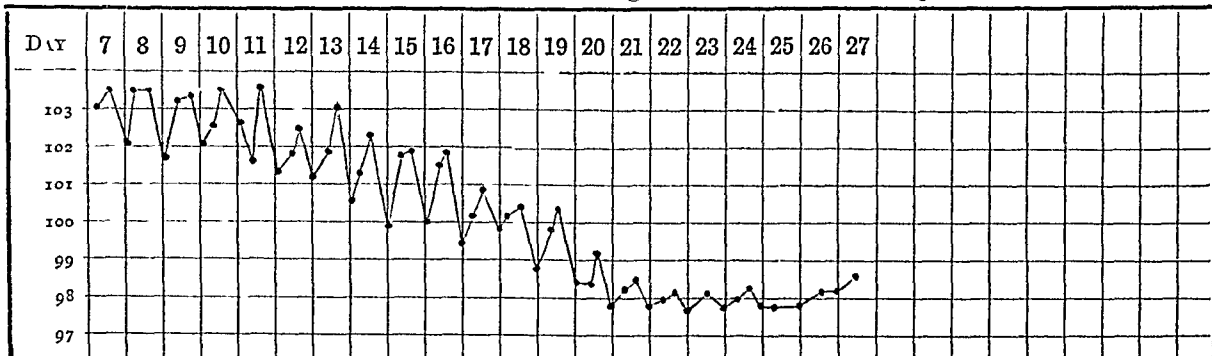
8 Mrs A woke during the night of 26th-27th June feeling cold, she shivered, became very hot, and violent fever was followed by profuse perspiration. On the 27th, at midday, had a similar attack, and again during the night and following day two separate and similar attacks. On the 29th had four such distinct paroxysms of rigor, fever, and diaphoresis, the thermometer rising during the fever to $105^{\circ}5$, and probably higher. At midnight had another flash of fever, and on its subsiding, quinine in five grain doses was taken every hour for five hours, and cinchonism induced. Fever then became continued. On the 30th June, 1st July, and 2nd July, on each day had forty grains of quinine. Diarrhoea set in. On 1st July she miscarried at five months. Then the diarrhoea became very violent, and collapse threatened. Lead and opium were freely administered and appeared to control the purging. Fever then gradually abated, but not before a bad bed sore had formed over one gluteal region. By the 14th July the temperature had fallen to normal, and from that day she convalesced steadily. The following chart indicates the temperature in this case. Since the fever her hair has fallen out. While this lady, her husband, and their servant were ill, I was attending three other cases of grave continued fever in foreigners.



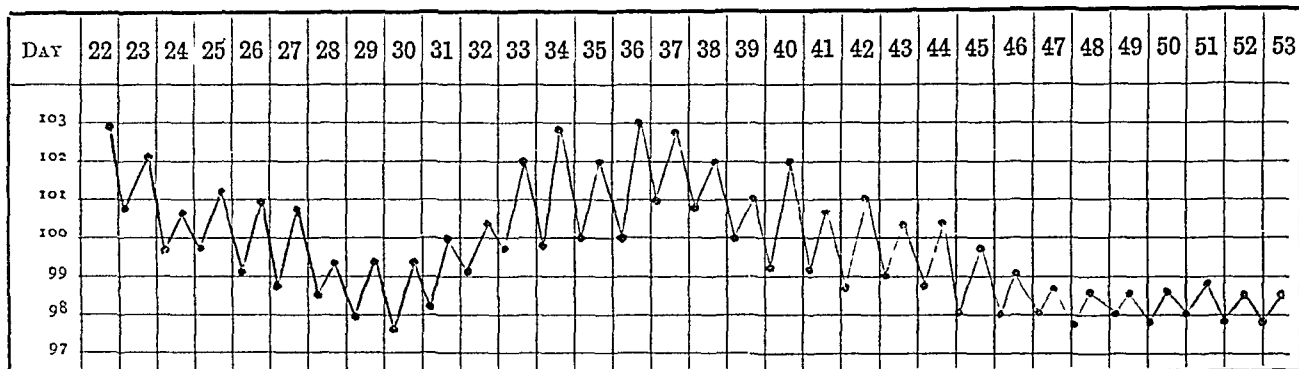
9 Mr B, about the beginning of June, had a sharp attack of ordinary summer diarrhoea. The violence of the attack abated, but for some time his bowels kept relaxed, and about the 10th June he began to be feverish. By the 15th he was confined to bed, his temperature ranging from 103° to $104^{\circ} 5$. Fever and diarrhoea persisted for at least three weeks longer and it was not until the 27th or 28th day of his illness that the temperature fell to normal. There was no marked iliac tenderness nor enlargement of the spleen, but he had delirium of a typhoid character, subsultus, and a few rose coloured spots. At the outset he was liberally drugged with quinine without benefit, during the latter half the treatment was entirely expectant. His temperature on the several days is shown in the following chart —



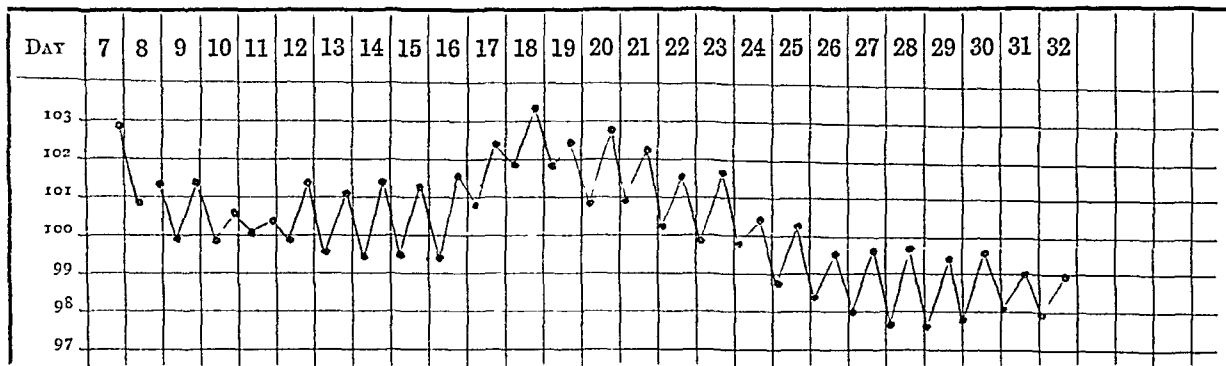
10 On the 18th or 19th of June Miss C began to complain of languor, headache, pain in the limbs, and fever. She took quinine for several days without benefit. On the 7th day of her illness the thermometer had risen to 103° , and diarrhoea was frequent. Fever and diarrhoea continued for a week longer and then gradually subsided, on the 21st or 22nd day she was convalescent. There were no spots, splenic enlargement, nor iliac tenderness. The following chart illustrates the temperature —



11 About the 4th of June Mrs D was attacked with fever and diarrhœa and præcordial oppression. She was living in what I considered a malarious locality. She took quinine in moderate doses all through her illness. About the 28th day the thermometer had fallen to normal, but this temporary improvement was quickly followed by a relapse, and it was not until the end of the seventh week that she could be pronounced convalescent. The rise and fall of temperature was thus recorded —



12 Her husband, Mr D, began to suffer from headache, lassitude and fever about the 26th July, a week after his wife began to get well. He had no diarrhœa, headache, lassitude, anorexia and fever were his only symptoms. He was treated with aperients and quinine. Towards the end of the second week he improved slightly, but relapsed, and it was not until the beginning of the fifth week that he began to get well. The following is his temperature chart —



In the case of the foreigners attacked, the fever has been followed in every instance by falling of the hair (I cannot speak to this point as regards the Chinese), but beyond this and slight debility, it has had no other sequelæ whatever.

One curious circumstance I would note in connexion with this epidemic. Of the six foreigners attacked, four were missionaries. All the foreign residents together number only about 260, including children. Of these, 20 are missionaries, or their children. If all the cases had occurred in one house, the circumstance of its being a missionary's house might be fairly ascribed to accident and some purely local and limited influence, but the cases occurred in three different houses. Two of the houses, it is true, were in close proximity, but the other was quite

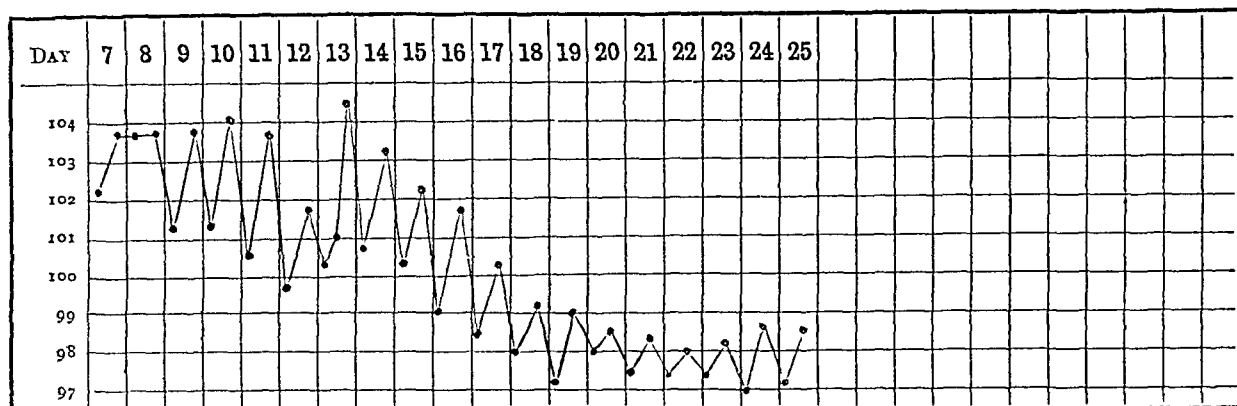
three-quarters of a mile distant, and in a most salubrious situation. It might be suggested that in course of their occupation as missionaries they may have been exposed to the same morbid influences, but I could trace nothing of this sort, and such a hypothesis is upset by the fact that the other two cases—husband and wife—were entirely unconnected with the missionary circle, and lived at some distance from any missionary's house. The only circumstance that I can discover connecting these six cases is the fact I have already stated, that all of them consumed milk from the same dairy, or from dairies situated in the locality I have already indicated as the focus of the epidemic among the Chinese. In my Report for the year ended 30th September 1879,* I remarked that there had been a circumscribed epidemic of what I believed to be typhoid fever on Kulangsu in the autumn of 1878. Curiously enough, this epidemic affected the same group of houses from which all the Chinese cases of this year came.

The fact that all of these cases occurred in a small community about the same time, and the majority of them in the same locality, amounts to presumptive proof that all of them were examples of the same disease. But that this disease was genuine typhoid is by no means so certain. In some, the symptoms supposed to be characteristic of this disease were present, in others, again, beyond the facts that the fever was continued and was uncontrolled by quinine, there was no evidence of its typhoid nature. One case was decidedly intermitting but in this instance quinine completely failed, so that it was probably non-malarial, but in another case—that of the little boy whose sister died—quinine appeared to cut the disease short at once.

An ingenious explanation of such anomalous fevers has been invented, and in place of candidly admitting that we really know little or nothing of their real nature, it has been affirmed that they are a combination of ordinary typhoid and intermittent or remittent fever, and the name "typho-malarial" applied to them. I do not think there is satisfactory evidence for the existence of such things as hybrid fevers. The old notion that the poisons of scarlet fever and measles sometimes combine to produce a third species of exanthematous fever has been abandoned. If we believe in the germ theory of the fevers, and that the germs are specifically distinct, it is difficult to conceive of the marriage of the distinct species. I do not think it likely that the specific typhoid germ and the specific malaria germ could combine to produce a hybrid germ. Possibly the typhoid germ might be swallowed by one already infected by malaria, or *vice versa*, but such an accident must be very rare, and epidemics of such a combined disease would be sure to be accompanied by a preponderating proportion of pure malarial fever and pure typhoid fever. An epidemic of typho-malarial fever could not occur in a community otherwise nearly entirely free from pure malarial fever and pure typhoid fever.

The truth is we are nearly entirely ignorant of a number of specific fevers which from time to time affect the inhabitants of foreign countries. I frequently meet with cases of continued fever both in foreigners and natives which do not admit of diagnosis and classification. For example, the case of fever imported from Tamsui last autumn, the temperature chart in connexion with which was noted as follows —

* See *Customs Medical Reports*, xviii, 58.

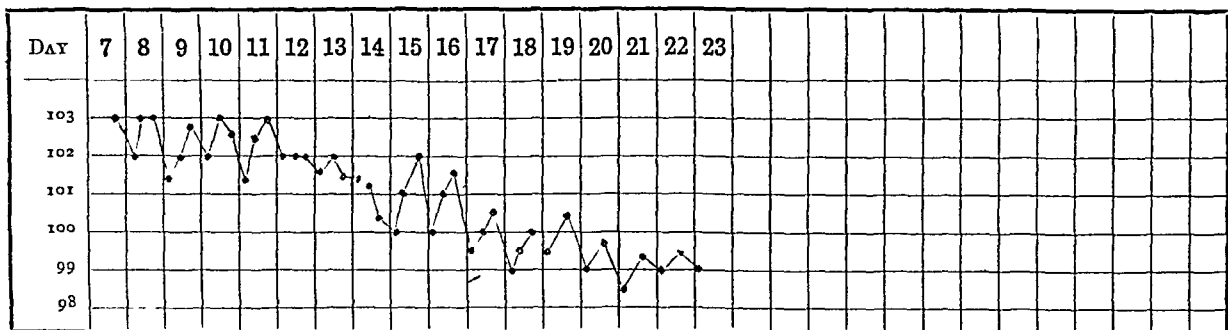


The history was briefly this —

The patient had frequently had "Tamsui fever." On 23rd November he felt pain in his left side, on the 24th, was feverish, on the 25th, had rigors and was much prostrated, and he took some quinine, fever continued, and on the 28th he left Tamsui, on the 29th he arrived in Amoy. He had then considerable fever, prostration, pains in the neck, arms and legs, and some tenderness of the epigastrium, his tongue was furred, he had severe headache, and he was covered from head to foot with an exanthem. The spots were circular, from $\frac{1}{16}$ " to $\frac{1}{8}$ " in diameter, red, not elevated, and disappeared on pressure. He had neither diarrhoea, iliac tenderness, nor enlargement of the spleen. The eruption kept out till 4th December. During that night he perspired profusely, and on 5th December the eruption had entirely faded, this was the day of highest temperature. From that date the fever gradually subsided, and he was convalescent on the 20th day of his illness.

The case in some respects resembled mild typhus, but wanted many of the features of that disease. Again,

A lightkeeper was brought in this summer from Chapel Island—a bare rock, miles from any land or opportunity of infection—ill with a continued fever. I saw him on the seventh day of his illness. He had much headache and was a good deal excited, but, beyond the ordinary phenomena of simple continued fever, had no particular symptoms. His temperature (shown in the following chart) did not reach the normal point till the end of the third week. He took abundance of quinine, but apparently without any curative effect on the fever.



What were these cases? Certainly not typhoid, and certainly not malarial.

Besides the well-known exanthematous fevers whose characteristics have been marked out in Europe, and are easily recognised, the medical practitioner in these parts has to deal with a

miscellaneous collection of fevers whose diagnosis and treatment he has for the most part to mark out for himself. A considerable proportion of these may perhaps be relegated to what is called "malaria," but there is a large residuum, examples of which I have just given, which can neither be classified among the known exanthems nor among the malarial fevers. Very soon after commencing practice in China I learned for practical purposes to separate the non-exanthematous fevers into what I designate quinine fevers and non-quinine fevers, *ie* into fevers which quinine cures speedily, and fevers on which quinine has no specific curative influence. Unless there are distinct indications to the contrary, I treat at the outset all cases of non-exanthematous fevers with aperients and quinine pushed to cinchonism, and if the fever is not thereby speedily cut short I conclude I have to deal with a non-malarial fever. The malaria bacillus, or whatever may be the specific cause of malarial fevers, is killed or paralysed by quinine, or quinine in some way interferes with its fever-producing effects. Given a fever which does not subside on the proper administration of the specific for malaria, I think we are justified in most instances in concluding that such fever is non-malarial. And if, in addition to the evidence supplied by this test, we find that such a fever subsides after a week or two spontaneously, and is not succeeded by the recognised consequences of malarial poisoning, such as agues, neuralgias, enlarged spleen, anaemia, and so forth, we have abundant reason for pronouncing it non-malarial. Every year I meet with such cases, and I confess to great confusion in my ideas with regard to them. One gets little satisfaction from books on the subject. Certain classifications are proposed, but when the attempt is made to attach a name to a given case the attempt is seldom satisfactory.

It was therefore with some hope of receiving fresh light on this subject that I read the reports of the Epidemiological Society's discussion on "Fevers in India" and the various papers by distinguished Indian authorities leading up to the debate. But I must confess to a feeling of complete disappointment at the outcome of the papers and the discussion they gave rise to. Dr NORMAN CHEVERS, in his very interesting "Practical Notes on the ordinary Diseases of India" (*Medical Times and Gazette*, 8th May 1880), says —

I believe that I have always, since the occurrence of my first case, been well acquainted with the cause and nature of the febricula, simple continued fever, and ardent fever of Bengal. As I did not see true enteric fever until I had served for many years in India, I treated all fevers, with the exception of the exanthemata, with quinine, the plain result of which is that from that day to this no case of simple continued fever or of ardent fever has ever fully developed itself under my observation.

He is careful to say that this statement applies only to Bengal. It certainly does not apply to South China, as may be gathered from many of the foregoing cases.

Surgeon-Major W GERARD DON says of febricula, simple continued fever, and enteric or typhoid fever, that they are—

Mutually allied and mixed up in their etiology and epidemiology. From what I have seen and read I cannot help thinking that the broad factors in all climatal fevers are, if not identical, entirely similar.

That is, that the cause producing simple continued fever produces typhoid fever. Adopting this etiology and Dr NORMAN CHEVERS' therapeutics, we ought to cure typhoid fever with quinine!

Dr JOSEPH EWART believes—

That many of the so called malarious remittents were simply typhoid or typhus fever modified, often marked for a time by malarious poisoning, but experience of enteric fever in India tends to show that malaria, such as is the accepted cause of prooxysmal fevers, is never the cause *per se* of enteric fever in India

He does not say in the paper I quote what he considers to be the nature of febricula, aident fever, or simple continued fever, but leads the reader to infer that a large proportion of such cases are really instances of typhoid fever

Surgeon-General C A GORDON has no fewer than ten species of fever presumably acknowledging ten different causes, besides ordinary typhoid fever, viz, 1, endemic continued fever, 2, continued fever of adynamic type, 3, febricula, 4, aident fever, 5, endemic remittent, 6, fever of uncertain type, 7, continued fever, 8, typho-malarial fever, 9, remittent, and 10, malarial endemic

It is very evident from these discrepancies of opinion that the clue to the proper classification of tropical fevers has not been found, and I do not think that it will be found until investigators disabuse their minds of the idea that these fevers must be modifications or combinations of two poisons only, the typhoid and the malarial. The history of the discovery of the difference between typhoid and typhus should ever be a warning when the attempt to assign a fever to its cause is made. We are too apt to assume that we can assign correctly the various causes of diseases, and dislike very much to say, when asked for an answer, "I don't know," or to think that there are forces and poisons in nature of whose existence we are ignorant

C—*Distoma Ringeri*

By PATRICK MANSON, M D

The list of parasites inhabiting the human body is gradually becoming a long one, another addition—the latest, I believe—has been recently made by Dr RINGER, of Tamsui, Formosa. The following notes embrace all that is yet known of the new parasite.

Some time ago, 6th November to 18th December 1878, I had in hospital here a Portuguese suffering from symptoms of thoracic tumour presumed to be an aneurism. He improved with rest and treatment, and returned to Tamsui, whence he had come and where he had resided for many years. He did not live long after his return, and died suddenly (June 1879) from rupture of an aneurism of the ascending aorta into the pericardium. Dr RINGER made the postmortem examination, and, knowing I took an interest in the case, kindly wrote me the particulars of the examination. Besides describing the immediate cause of death, he told me he had found a parasite of some sort in making a section of the lung, and promised to send the animal to me for inspection. He wrote —

After making a section I found the parasite lying on the lung tissue—it might have escaped from a bronchus. Whilst alive a number of young (microscopic) escaped from an opening in the body. There were some small deposits of tubercle, no cavities, and, if I remember right, slight congestion of the lungs.

Last April a Chinaman consulted me about an eczematous eruption he had on his face and legs. The eruption had been out for some time, and had its origin, he believed, in an attack of scabies. Whilst he was speaking to me I observed that his voice was rough and loud, and that he frequently hawked up and expectorated small quantities of a reddish sputum. At that time I was making examinations of lung blood in connexion with another subject, and as this man's sputum afforded a favourable opportunity for examination, I placed a specimen under the microscope. The sputa, which to the naked eye appeared to be made up of small pellets of rusty pneumonic-like spit, specks of bright red blood, and ordinary bronchial mucus, contained, besides ordinary blood and mucus corpuscles, large numbers of bodies evidently the ova of some parasite. These bodies were oval in form, one end of the oval being cut off or shut in by an operculum, granular on the surface, blood-stained, measuring on an average $\frac{1}{100}$ " \times $\frac{1}{100}$ " (Figs 1, 2, and 3). Firm pressure on the covering glass caused them to rupture and then contents to escape, the shell being left empty and fractured at the opercular end (Figs 4, 5), though empty, the shell had a pale brownish-red colour. No distinctly organised embryo could be made out in the uninjured ovum, but when the contents were expressed they resolved themselves into oil masses, and granular matter having very active molecular movements. A delicate double outline could be made out in most of the ova. They were so numerous that many fields of the microscope showed three or four of them at once.

Two days afterwards I again examined this man's sputum, and found it full of ova as on the previous occasion. I asked him to come again and to supply me from time to time with

Fig 1



Fig 2



Fig 3



Fig 4

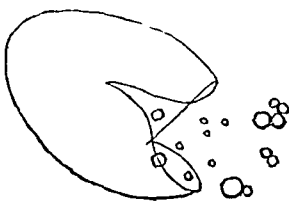


Fig 5



× 350

PLATE to illustrate Dr MANSON'S Paper on DISTOMA RINGERI

Fig 6

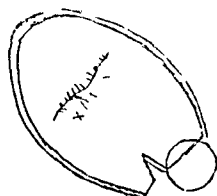


Fig 7

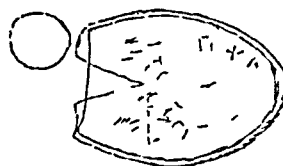


Fig 8



× 350

Fig 9



Natural size of Pusite

sputum, but he did not return, and has left the neighbourhood, I believe. I hoped to attempt successfully the hatching of the ova, as has already been done in the case of other distomata, but his disappearance and my failure to get another and similar case oblige me to postpone the experiment.

At his first visit I obtained the following particulars of his case —

Tso-tong, male, æt 35, native of Foochow, a secretary in the Salt Office, resident in Amoy about one year.

He was born in Foochow city and lived there till he was 21 years of age, he then went to Tecktcham, a town in North Formosa, about two days' journey from Tamsui, and resided there for four years, then he returned to Foochow for 1 year and 1 half. He was again sent to Tecktcham for 1 second service of four years. He returned again to his native town for 1 year, and was then sent for six months to Henghwa. Afterwards he lived successively in Foochow, one year, Amoy, 1 year and half, Foochow, four months, and, again, Amoy for one year, where he is at present stationed. A year after his first arrival in Tecktcham, when he was 22 years of age, he first spat blood. Every day for 19 days he brought up from an ounce to half an ounce of blood, he emaciated slightly, but had very little cough. Hæmoptysis returned about six months later, smaller in quantity, but, as in the former attack, the blood at first was pure, unmixed with mucus, and of a bright red colour, this second attack lasted for a few days only. Since then he says he has spat blood for two or three days at a time, in small quantities, every second or third month. He has never had much cough, and he says the blood is always mixed with mucus after the first mouthful. Once during two years he had no blood spitting. Though rather thin, he enjoys good health. I could discover no signs of lung disease on auscultation. His father is dead, but never had a cough, his mother had a cough and died 10 years ago. He has had two brothers and two sisters, they are all of them alive and in good health.

When I discovered the ova in this man's sputum I recollected Dr RINGER's parasite, and that the Portuguese in whose lungs it was found had also lived for many years in North Formosa, and I came to the conclusion that this Chinaman's lungs probably contained a similar parasite, and that it was the cause of his blood-spitting. At my request Dr RINGER sent me the solitary specimen he had found a year before. It was preserved in spirits of wine. I placed a little of the sediment in the spirit under the microscope, and found in it several ova of the same shape, colour, and dimensions as those I some time before found in the Chinaman's sputum. Most of the ova were ruptured, a few, however, were still perfect (Figs 6, 7, 8). The parent parasite was of the shape, size, and outline represented (Fig 9). It was of a light brown colour, firm, leathery texture, and measured $\frac{1.4}{32}$ " \times $\frac{5}{32}$ " \times $\frac{1}{32}$ ". It was evidently a distoma, but, not feeling sure if it was a new species or not, I sent it to Dr COBBOLD, who has pronounced it to be new, and has named it *Distoma Ringeri*, after the discoverer. Referring to the specimen, he says —

I satisfied myself that the fluke was new to science, and accordingly I propose to call it *Distoma Ringeri*, after the discoverer. Though mutilated, the oral sucker was well shown, as also were traces of an organ which I regarded as the remains of the ventral acetabulum. When flattened on a glass slide, the capsules of the vitellarium were well seen, and occupied fully four-fifths of the body, lying deep under the dermal surface. The worm reminds me very much of *distoma compactum*, which many years ago I detected in the lungs of an Indian ichneumon, but it is much larger and evidently a distinct species — *Journal of the Quekett Microscopical Club*, No 44, August 1880.

We are as yet not in a position to say much about the pathological significance of this parasite. I do not think it common in this locality, but when practising in South Formosa I recollect seeing many cases of chronic and oft-recurring blood-spitting without apparent heart or lung lesion, and it is just possible that the hæmoptysis in many of these cases was caused by distoma Rengeri. My patient told me that blood-spitting was a very common complaint in Tecktcham.

The intermediary host or hosts, the geographical distribution, and the mode of entrance of the parasite into the lungs offer a very interesting field for future investigation. *

* In the *Lancet* (1880, vol. ii, p. 548) a summary appears of a paper by Professor BAELZ of Tokio in which the discovery of a new lung parasite is announced. It is possible that the cystic bodies containing jelly like material and enclosing colourless spherules, which Professor BAELZ classes with the gregarine, may be an embryonal form of the Distoma Rengeri. The point is worth investigation, and it may perhaps be cleared up by careful examination of the sputa from cases of that form of hæmoptysis, common among natives of China, which is unassociated with organic disease of the lungs.



§ D—Additional Notes on *Filaria Sanguinis Hominis* and Filaria Disease

By PATRICK MANSON, M D

I REVERT to this subject in continuation of my paper in last year's Reports, in order to bring forward some evidence lately obtained, corroborating unmistakably my conjecture as to the habitat of the parent filaria. Those who have followed these investigations will remember that, reasoning from the position in which I found in certain cases the ova and embryos of the parasite, I concluded that the parent worm lived in the lymphatic trunks. The following are my notes of a case in which I found the mature parasite *in situ* and in the place conjectured. The parent worm has been found by BANCROFT in Australia, LEWIS in India, ARAUJO in Brazil, but this is the first time, as far as I know, in which it has been possible to state precisely from direct observation the particular structure it occupied. I therefore think the observation of sufficient value to justify its publication.

Case 57 *Lymph Scrotum, Filaria Embryos in Lymph from Scrotum, but not in the Blood, Excision of part of the Scrotum, Parent Filaria in dilated Lymphatic*

PHE, male, æt 46, Phoolamkio, Jukhæ, pedlar and fumer. Four or five years ago he noticed that after much walking had pain in both groins along the course of the spermatic cords, but he says it was never or very seldom associated with fever. He has never had inflammation or abscess of the scrotum. At first there was swelling of and pain in the groin lymphatics, but on the bursting of a vesicle which had formed on the scrotum and the escape of much fluid these subsided. During the first year or two, scrotal discharges occurred only once or twice a year, then they became more frequent, and during the last three months the discharge has been nearly constant. It may stop for a day or two occasionally, but as a rule the scrotum drips lymph night and day, perhaps to the extent of 10 or 15 ounces in the 24 hours. The discharge, he says, is always clear like water, and when collected in a bowl, coagulum with red particles and streaks on it forms rapidly. Has never had chyluria nor any serious illness. He is very thin and anæmic, but though much debilitated, is in fairly good health.

October 11th, 1880—Inguino femoral glands on both sides enlarged, especially those on the right side, they are neither distinctly varicose nor firmly indurated, but have a soft spongy feel. The bulk of the scrotum is only slightly increased, but everywhere on its dusky red lower surface are scattered innumerable minute vesicles, varying in size from a No 6 to a No 2 shot. Picking any of these permits the escape of a clear watery fluid. As I examine the scrotum, this fluid, oozing from some ruptured vesicles, drips constantly. The right testicle is absent, probably undescended, there is no hydrocele on the other, which feels large and healthy. The under surface of the sheath of the penis is somewhat swollen, but is not vesiculated. The scrotum feels soft and silky. There is no elephantiasis or swelling of the legs.

The clear watery nature of the lymph is peculiar. I found, in a short examination of sediment of some drawn at 11 A M to day, one embryo filaria. I collected two other specimens of lymph, one drawn between 4 and 5 P M, the other at 7 P M, and stood the three specimens to await resolution of coagulum.

Blood drawn from the finger at 7 45 P M had no filariae, again, at 8 P M, examined a large slide, $1\frac{1}{2} \times 1$ ", but found no filariae. The blood is very watery and deficient in corpuscles.

* See Customs Medical Reports, xiii, 30, xiv, 1, xviii, 31

October 12th —Examined the sediment of the three specimens of lymph, viz, that drawn yesterday at 11 A M, at 5 P M, and at 7 P M, and found embryo filariæ in all of them, two or three in every slide of sediment. It is evident from this that the filariæ observe no periodicity while they are in the lymph, and that reproduction is a continuous process.

In this case I believe the obstruction in the lymphatic circulation of the scrotum is very low down, probably not higher than the inguino-femoral glands, and that it is complete, because, 1st, had the lymph regurgitated after passing through glands, it would probably be milky or sanguineous, and be much richer in corpuscles than it is, 2nd, it is clear and watery, as it is near the radicles of lymphatics, 3rd, there is an absence of marked varicosity of the lymphatic glands it first reaches (were the obstruction higher up the lymph circulation, these lower glands would be distended by accumulating lymph), 4th, filariæ in lymph, but not in the blood—proving that the obstruction is complete. I think it probable, considering these facts, that the parent worm is between the surface of the scrotum and the first lymphatic glands, and that we will find it when the scrotum is excised. (This was written before the operation.)

October 15th —Removed part of the scrotum this forenoon. The dripping of lymph continuing, I thought it advisable to operate to save the man's life. As he lay on the operating table under chloroform, I could see the anterior border of the spleen bulging out the relaxed and wasted abdominal muscles, and could feel that the organ was very much enlarged. Under such circumstances, I generally abstain from all serious operations, but when I remembered the corpuscular and watery state of the blood, the absence of a history of malarial fever—the usual cause of splenic tumour here,—the probability that it was the result of the state of the blood, and that this, again, was caused by the constant day and night dripping of lymph from the scrotum, I determined to proceed. The operation was a very simple affair. I dragged down the affected portion of the scrotum till it was clear of the testicle, transfixed the fold thus formed with a finger knife, cut upwards and then downwards, removing a circle about 2½ or 3 inches in diameter of soft, spongy, watery scrotum. Only three arteries required ligature. Pressure with the palm of the hand over the right inguino-femoral glands forced from an enlarged lymphatic on the upper and right corner of the wound a stream of lymph the thickness of a fine knitting needle, and with a projection of 3 or 4 inches. The lymph thus expressed was clear and watery. I failed to do the same on the left side. The solitary testicle—the left—was healthy. The edges of the wound were brought together and united with catgut sutures.

The scrotum when excised had been placed in a clean bowl, and when the operation was finished I took it up and carefully examined the cut surface. Finding nothing unusual, I folded it up, intending to examine it at my leisure. However, being curious about my prognostication, I took it up again, and, unfolding and exposing the cut surface, saw wriggling on it very vigorously a long and slender worm, of a catgut opaline look, the thickness of a medium-sized horse hair. One end of the worm was free, the other entered the cut end of the lymphatic corresponding to that from which I expressed the lymph on the right side. About 2 inches of the worm was free. I tried to coax out the rest with my finger, but failed. The worm appeared to be working back again into the scrotum. Fearing it would succeed in this, and also being afraid to crush it with the forceps, I laid it on the handle of a scalpel. When it had partly dried and adhered, I made gentle traction, but the worm snapping in the vessel, I procured only about 2 inches of the free extremity, with long pieces of uterine tubes and alimentary canal dangling from the transverse fracture of the integument.

I did not attempt any further examination of the scrotum (which contains the caudal end of the female, and probably the male worm), but placed it in spirits, and have sent it to England

Dr BENNETT, of HMS *Swinger*, was present and assisted at the operation and saw the worm

The same evening I examined with the microscope that part of the worm I had broken off. It was the head end of a female. The body was quite plain, without any markings, and tapered rather abruptly to the simple somewhat club-shaped mouth. The vagina opened about $\frac{1}{2}$ " from the mouth, uterus was packed with embryos in different stages of development. In the lower part of the uterine tubes the embryos lay at full length, outstretched as we see them in the blood, and the sheath was very distinct in one embryo that had escaped from the vagina. This particular worm was certainly not oviparous. The following are my measurements, carefully made —

Greatest diameter of body	$\frac{1}{12}$ "
Diameter of alimentary canal	$\frac{1}{100}$ "
„ head at shoulder	$\frac{1}{450}$ "
Orifice of vagina from mouth	$\frac{1}{2}$ "
Diameter of body at vagina	$\frac{1}{12}$ "
Ova before differentiation of embryo, cleavage complete	$\frac{1}{850}' \times \frac{1}{850}''$
Ova after differentiation of embryo	$\frac{1}{210}'' \times \frac{1}{700}''$
Diameter of uterine tubes	$\frac{1}{100}$ "
Free embryo	$\frac{1}{1}'' \times \frac{1}{5000}''$
Length of sheath visible beyond the head of the free embryo	$\frac{1}{1400}''$

The animal was mounted in urine (of a specific gravity similar to that of lymph) for examination. In such a medium the parts retain their natural proportions, if mounted in water, glycerine or spirits, there is often much distortion, and an incorrect idea of relative and actual size produced.

October 15th —Doing well. A slide of blood drawn from the finger at 5 30 P M contained no filariæ.

October 16th —One slide of blood drawn at 5 30 A M contained no filariæ.

October 26th —Had an attack of fever yesterday, and he is still hot. The sheath of the penis is considerably swollen, but otherwise the case is doing well, the wound is granulating kindly, and there has been no escape of lymph since the operation.

November 3rd —Wound nearly healed. Swelling of penis subsided. Patient, who has been taking large quantities of iron, much stronger, spleen smaller, blood still very deficient in corpuscles, one slide drawn at 6 P M contained no filariæ.

November 6th —Wound healed, no filariæ in the blood, going home to-morrow.

E—DR B S RINGER's Report on the Health of Tamsui and Kelung
for the Year ended 30th September 1880

DURING the past twelve months the health of the foreign community at these ports has been comparatively good. During the summer, as usual, malarious fevers were somewhat troublesome, but in most cases not very severe.

In one patient, who has resided here for more than two years, and had hitherto been entirely free from fever, an attack of well marked tertian intermittent came on early in the summer, and lasted some 10 days or so.

I have now had frequent opportunities of observing that foreign residents in localities where so-called malarious influences exist may ward off their deleterious effects for a considerable period, even for years, but may suddenly although living apparently under precisely similar circumstances, be seized with an attack of ague or remittent fever, and with no further cause than one can discover than perhaps a slight chill or a very brief exposure to the sun, such as would usually be passed by without a thought, and in some cases absolutely nothing out of the ordinary routine of daily life can be called to mind by the patient to account for the attack.

My experience has further shown me that when once a patient has suffered severely from remittent or intermittent fever it requires, as a rule, but a slight cause, such as getting wet or being exposed to the sun for but a short period, to start the blood poison fermenting, if I may so express it, and produce another attack.

One or two instances of continued fever lasting for two or three weeks, with a high temperature, sometimes up to 103° or 104° F, with no skin eruption, and apparently unaffected by medication, certainly not improved by quinine, have been under treatment. In these cases long exposure to the heat of the day seems to have been the exciting cause.

All such cases as the foregoing are generally put down to the influence of malaria, from which it seems to me that our knowledge of the pathology of malarious disorders is at present somewhat imperfect, and much good work might, I think, be done in this direction by careful records of all such cases in different localities, with notes of habits of life and age of patients, condition of dwellings, influence of treatment, etc.

Excision of the Inferior Maxilla for Cystic Disease—A fumer, aged 35, presented himself towards the end of May, complaining of a swelling in the face and a foul discharge into the mouth, the symptoms having commenced about two years previously. On examination, a hard, painless, and immovable tumour was observed on the right side of the face, extending from the articulation of the jaw to a point midway between the angle and the symphysis, and on the inner surface of the cheek, near the molar teeth, an ulcerated opening was found, from which a most offensive discharge was poured into the mouth, and into which a probe could be passed for about 2 inches. Several of the teeth were loose, and the whole now was

pushed considerably out of the natural curve into the floor of the mouth. The patient had been unable to eat on that side for a long time, and was extremely anxious to have something done to relieve him, and had come from a distance of several days' journey in the country. On the 4th June he was placed under the influence of chloroform and an incision was made, commencing just in front of the articulation and extending downwards along the margin of the jaw to the chin, where it was carried upwards and terminated below the lip. The soft tissues of the cheek were now dissected off close to the tumour, both ends of the facial artery were secured, and bleeding vessels, which were very numerous, were tied as soon as severed. The lower margin of the maxilla was now exposed by careful dissection close to the bone, which was then partly divided by a small saw into the socket of a bicuspid tooth, which had been previously extracted, and the division of the bone was completed with a pair of cutting forceps, and the jaw elevated and carefully cleared from all soft tissues. The ligaments were divided and the head of the bone turned out of the socket. The wound was loosely filled with oiled lint, and the flap adjusted with silver sutures.

A subcutaneous injection of morphia was administered in the evening and the patient passed a comfortable night. The dressings were removed on the second day and the patient progressed favourably. Ten days after the operation a considerable amount of healing had taken place, but some pain was experienced near the spot at which the maxilla had been divided. A loose piece of bone about half an inch square was found in the wound and extracted without difficulty. From this time forward the patient continued to improve, and in about six weeks time left the hospital with the wound firmly healed all but a small opening at the base, from which a little saliva flowed, but which was daily decreasing.

Examination of the tumour showed the walls of the maxilla to be widely expanded and partially separated by firm fibrous bands into three chambers, which contained a dark coloured, cheesy material. The cyst walls were quite distinct and could be readily separated from the bone, which had been in some places completely absorbed.

F—Dr E P McFARLANE'S Report on the Health of Ichang

THE town of Ichang, situated in latitude $30^{\circ} 14' 25''$ N and longitude $111^{\circ} 18' 34''$ E, lies on the north bank of the Yangtze, about 1,000 miles from the sea. The foreign population of the town is 17, and this includes 5 ladies and 2 children. The general health of the community since my arrival in Ichang nearly two years ago has been upon the whole very good. This is more especially to be noted as all the foreigners are living in native houses, and the majority of them inside the city wall, in localities where it is hardly possible for them to escape the effluvia caused by the inefficiency of sanitary arrangements.

Ichang has the name of being unhealthy from the fact that three Commissioners left it seriously ill. Two died of abscess of the liver shortly after leaving Ichang and before my arrival in the country, the third, who was Assistant-in-Charge when I arrived, had to leave in August 1879, as he was suffering from mital disease. I do not believe that the climate was the cause of the above diseases, as the patients with liver abscess were only a very short time here when they were invalided, and probably brought the affection with them. The case of mital disease was of several months standing before my attention was drawn to it.

Two births took place during last summer. One child died when 7 days old. It was premature, and doomed from its birth. The mother had a lingering illness owing to the bad ventilation of the house in which she was delivered, but on her removal to a building where air could find access she made a rapid recovery. Apart from feelings of languor and an occasional attack of dyspepsia experienced by those living in ill-ventilated houses, no acute or specific disease attacked a foreigner in Ichang since my arrival. A few of the community have suffered several times from ague, but it was always so slight that a dose of quinine was all that was wanted to bring about a cure.

The sanitary conditions of Ichang are most deplorably neglected, notwithstanding the comparatively good health enjoyed by foreigners in it. Efficient drainage is utterly uncared for by the Chinese in this town, and no precautions whatever are taken to prevent obnoxious smells or to clear away from the entrance of the drains the rubbish which collects there. The whole town is drained after some method, but no sooner does a heavy shower of rain fall than the streets are flooded with water, and passengers may be seen walking up to their knees in it. Privies are very numerous, and as they are emptied as a rule only once a week, their contents have ample time to undergo putrefaction. The farmers, who buy the soil for manure, come at all hours of the day and carry off their purchase through the streets of the city. As the latrines are never thoroughly emptied or washed out, the consequence is that the nuisance caused is never absent. People of the poorer class live as a rule in the open air all day, but notwithstanding their absence, their sleeping apartments remain laden with abominable odours, against which no precautions are taken by means of ventilation.

The piece of ground marked out as the English Concession is perhaps the best spot that could be chosen about the city for foreigners to reside on. It is situated on the north

bank of the river, about 300 yards from the south gate of the city. The distance will prove sufficient to enable residents to escape the obnoxious smells consequent on the bad sanitary arrangements of the town. The space is quite open and commands a magnificent view on all sides, the only native houses near being those on both sides of the street leading up to the city, and a few huts on the south side. The Concession is bounded by the river in front, and immediately to the back is a large piece of land where the Chinese in former days buried their dead. So far as I know, no interment is now made there. Here the river flows in a south by south-east direction, and is about a quarter of a mile broad in summer and somewhat less than that in winter. The city side, although not hilly, rises to a considerable extent at a distance of about half a mile from the banks of the river. The country on the opposite side (south) is rather hilly, and a few miles inland it becomes quite mountainous. Another great advantage, and perhaps the most enjoyable for a foreigner in the summer, is that the wind as a rule is from the south and blows up river. It is therefore hardly possible that it should bring anything deleterious to health, as it passes over a long stretch of mountainous country, with very little, if any, decomposed vegetable matter, and afterwards blows up river a distance of about 10 miles. This breeze, which invariably blows in the afternoon, is very fresh and invigorating in the summer. Any decomposed vegetable matter about the rice fields, which lie at a considerable distance to the back of the Concession, is blown in a northerly direction. The plot of ground has also all the sanitary advantages that could be desired, as it slopes towards the river.

The disadvantage in this piece of ground lies mainly in its liability to be inundated should the river rise several feet above its usual height in the summer. I am inclined to believe myself that should the water rise high enough to inundate the Concession, the whole city would likewise be flooded. Such catastrophes are expected by the Chinese every 10 years, and great anxiety prevailed this summer, as it is now 10 years since the last flood. Foreigners as well as natives were, however, happily disappointed. In the case of merchants or others building houses on the Concession, precautions should be taken to raise the foundations at least 6 feet high as a safeguard against the more serious inconveniences to which a householder is put when such a disaster as a flood occurs. I am decidedly of opinion that Ichang is healthy. I infer this from the facts already mentioned regarding the Concession ground, and from the general good health of the foreigners at present residing in and about the town. On the hills and in the valleys on the opposite side of the river pleasant walks can be got, although the roads are bad. The air is bracing and enlivening in all the surrounding country, and only about three miles up river is the commencement of the renowned gorges of the Yangtze, where a complete change is experienced by the visitor.

The summer of 1879 was much hotter than that of 1880. The thermometer for several days stood at 99°, and for fully five weeks we had no rain. The two hottest days of this summer were 4th July and 2nd August, the thermometer standing, as will be seen from the following table, at 91°. We have had a large share of rainfall during the hot months, which served to keep the atmosphere cool without causing any inconvenience otherwise. To my knowledge the heat had no bad effect on any of the residents.

For the following meteorological table I am indebted to Mr ALFRED COPP, of the Inland Mission —

MONTH	THERMOMETER—NOON			BAROMETER—NOON		
	Maximum	Minimum	Mean	Maximum	Minimum	Mean
March	° 70	° 48	° 57	<i>Inch</i> 30 53	<i>Inch</i> 29 77	<i>Inch</i> 29 85
April	78	54	64	30 38	29 81	30 04
May	87	65	76	30 07	29 54	29 81
June	84	73	80	29 95	29 55	29 69
July	91	76	83	29 72	29 55	29 62
August	91	72	79	29 97	29 54	29 66

I append a table of the diseases attended to by me at the Scotch Mission Dispensary. Although I have made strenuous efforts to get natives to remain in the hospital to be cured, I have so far failed. They will undergo any amount of pain, and drink medicine *ad libitum* if permitted to go home immediately after it. I am hoping that in a year or two we shall be able to overcome their prejudice against the foreigner, and so have a better opportunity of making a clearer investigation of the diseases of this neighbourhood. Skin and eye diseases are more prevalent than any other. From the number of ague patients it will be inferred that we are not quite free from miasmatic poison, but it is remarkable that, so far as I was able to gather, no other fever is known to the natives of Ichang. The absence of epidemic disease and of elephantiasis, and the scarcity of morbid growths among the natives, are much in favour of what I have already said in regard to the healthy locality of Ichang. The last epidemic of cholera that invaded these parts was in 1850.

OUT-DOOR PATIENTS attended to at the SCOTCH MISSION DISPENSARY during the
Half-year ending 31st August 1880

<i>I</i> —GENERAL DISEASES —		Phthisis	31 cases
Ague	49 cases	Pneumonia	14 "
Opium-smoking	24 "	Asthma	4 "
Cancer of lip	1 "	<i>Diseases of Heart</i>	
Carbuncle	1 "	Chiefly mitral disease	45 "
Rheumatism	124 "	<i>Diseases of Kidneys</i>	12 "
Scrofula	41 "	<i>Diseases of Digestive System</i>	
Dropsy	2 "	Affections of mouth, teeth, etc	44 "
Elephantiasis (scrotum)	1 "	Dyspepsia	225 "
Lumbago	67 "	Dysentery	21 "
Syphilis	102 "	Diarrhœa	31 "
<i>II</i> —LOCAL DISEASES —		Fistula	15 "
<i>Diseases of Respiratory System</i>		Congestion of liver	2 "
Bronchitis	157 "	Hæmorrhoids	3 "
Bronchial catarrh	22 "	Constipation	2 "
Pleurisy	10 "	Hernia	15 "

Diseases of Generative Organs

Hydrocele	2 cases
Leucorrhœa	1 "
Ochritis	9 "

Diseases of Urinary System

Gonorrhœa	29 "
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Diseases of Eye

Conjunctivitis	160 "
Corneitis	145 "
Iritis	50 "
Pterygium	29 "
Entropion	11 "
Cataract	19 "
Staphyloma	2 "

Diseases of Cutaneous and Sub-cutaneous System

Abscess	46 "
Whitlow	2 "

Ulceration

155 cases

Eczema

32 "

Ringworm

135 "

Scabies

941 "

Diseases of Joints

Synovitis

57 "

Arthritis

3 "

Diseases of Nervous System

General paralysis

2 "

Hemiplegia

4 "

Hysteria

1 "

Diseases of ear

53 "

Wounds

6 "

Burns

4 "

Fractures

3 "

Dislocations

9 "

G—Dr A S DEANE'S Report on the Health of Wuhu for the Half-year
ended 30th September 1880

WUHU, situated on the Yangtze, in latitude $31^{\circ} 19' 12''$ N, longitude $118^{\circ} 23'$ E (approximately), has a Chinese population estimated at about 40,000. Judging from the experience I have had during the past eight months, and from what I can learn from those who have resided here for some time, the general health of the natives does not indicate an unhealthy condition of this situation. The present year, moreover, contrasts very favourably with 1879, when the Superintendent of Customs very generously instituted a free dispensary, attended by two native "doctors" to administer relief to the sick of this neighbourhood, and it is stated that over 3,000 patients were prescribed for and medicines found them, at a cost of more than £1,000. This year no such tax on the Superintendent's charity has been needed.

The Chinese that presented themselves to me for treatment were few, and, with the exception of five or six cases of intermittent fever and dysentery, mostly suffered from eye diseases or were the subjects of cutaneous affections or slight injuries. This small sick rate has been undoubtedly due to the mildness of our summer, coupled with the absence of floods.

The health of the foreign community has not been as satisfactory as I should wish. From time to time some have complained of a general feeling of malaise and considerable gastric disturbance, accompanied at times by diarrhoea, at others by constipation—the axillary temperature showing a rise of from $1^{\circ} 5' F$ to $3^{\circ} F$ above the normal,—with a general indisposition for work towards the afternoon, the rise in temperature being best marked at this time also. These symptoms continue from two to six days, when they pass off under the influence of quinine. In these slight and latent forms of malarial fever the stages of rigor and pyrexia were wanting, the third stage being more or less marked in every case.

The cause of these attacks is not to be found in habits or mode of living, and although the climate is in most cases blamed, it is in truth far from being unhealthy. On the contrary, I think one of the healthiest European settlements could be made here, a few yards more inland and at the back of the present foreign habitations.

The houses occupied by foreigners are for the most part situated on the river bank, on alluvial soil, and in summer when the river is high it percolates through this light sandy deposit, the surface of which is in some places not more than from a few inches to three or four feet above the level of the water. Consequently, during the latter part of spring, in summer and early autumn the basement stories of these houses must be damp, which in its turn renders the air of these apartments humid, and perhaps malarious at certain seasons. Few of the houses which can be occupied by foreigners possess upper stories, necessarily, some residents have to live on the ground floor of edifices which are not of the best architecture, and in an atmosphere

not conducive to health, to which I think the symptoms above detailed are mainly due, and not to the climate, as some people will have it

Wuhu presents rare opportunities for the erection of a few highly sanitary dwellings on the hills which lie quite close to the town. These are small, well raised above the possibility of floods, the drainage is perfect, and for business relations with the town leave nothing to be desired. Ever long I hope to see some of them occupied by foreigners.

METEOROLOGICAL REGISTER

MONTH	BAROMETER			THERMOMETER			No. of Days Run
	Maximum	Minimum	Mean	Maximum	Minimum	Mean	
	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>°</i>	<i>°</i>	<i>°</i>	
April	30.45	29.70	30.09	79	41	57.00	14
May	30.09	29.57	29.92	88	53	69.93	11
June	30.04	29.64	29.80	87	64	73.66	8
July	29.92	29.59	29.77	85	71	78.40	10
August	30.09	29.58	29.81	87	66	78.10	12
September	30.29	29.87	30.05	85	65	72.09	6

*H—Dr E I Scott's Report on the Health of Swatow for the Half-year
ended 30th September 1880*

I AM indebted to the courtesy of Mr Harbour Master RAL for the following table of meteorological observations for the summer six months The past season has been one of the coolest for many years at this port, and also one of the wettest

ABSTRACT from METEOROLOGICAL TABLE

MONTH	WINDS					MERCURIAL BAROMETER				THERMOMETER						RAIN AND FOG			TIDES	
	Number of Days N to E	Number of Days E to S	Number of Days S to W	Number of Days W to N	Number of Days Calm	Highest by Day	Lowest by Day	Highest by Night	Lowest by Night	Highest by Day	Lowest by Day	Highest by Night	Lowest by Night	Average Wet Bulb	Average Dry Bulb	Number of Days Run	Number of Inches Rainfall	Number of Days Fog	Average Rise, Spring Tides	Average Rise, Neap Tides
April	D h 17 19	D h 4 13	D h 1 7	D h 1 14	D h 4 19	Inch 30 33	Inch 29 89	Inch 30 28	Inch 29 92	° 80	° 61	° 76	° 54	° 67	° 68	D h 5 10	Inch 3 475	D h 2 0	ft in 6 6	ft in 4 7
May	14 7	10 0	4 13	1 9	1 5	30 11	29 87	30 10	29 87	86	70	82	67	70	73	7 22	5 975		6 9	5 5
June	5 18	11 11	11 10		1 9	30 05	29 78	30 03	29 76	86	77	82	70	78	80	12 12	14 725		7 6	6 3
July	2 5	14 17	10 22		3 4	30 00	29 65	29 98	29 67	92	82	86	78	79	83	2 20	4 600		7 0	6 3
August	1 14	12 9	13 19	1 10	1 20	30 06	29 63	30 09	29 64	92	80	87	78	79	84	2 21	5 175		7 3	6 5
September	14 6	6 17	2 1	3 0	1 50	30 11	29 64	30 09	29 37	93	80	88	76	78	81	3 17	5 700		7 0	5 10

Note —Tides very irregular, not to be depended on being greatly influenced by the winds

The health of foreigners has been unusually good I have had hardly any serious cases to deal with, and the ordinary cases of summer diarrhoea and fever have been less frequent and less severe than usual It has been a very healthy season for natives also, for, as far as I can learn, there has been no serious illness of an epidemic character, a circumstance rather remarkable, considering the extreme dirt of Chinese towns and villages I have not heard the word cholera used once, though usually during the hot months this disease is endemic amongst Chinese I presume the amount of rain which fell helped to produce this satisfactory state of affairs, by flushing and cleaning out the drains, carrying away much, if not all, the decomposing vegetable and other matters which accumulate in such quantities

There has been a grievous disease epidemic amongst the cattle in this district, killing as many as 90 per cent of the cows and buffaloes in some villages I have endeavoured to ascertain

the exact nature of this complaint, but, possibly from unwillingness on the part of the Chinese to give information concerning it, I have been unable to get any reliable data. I can only learn that the disease seemed somewhat like cholera, either prostrating the animal at once and ending fatally in a few hours, or beginning with diarrhoea, which, gradually becoming worse, ended equally fatally in a few days. The Chinese ate the flesh of the diseased animals with impunity, and I heard some of them attributing the remarkable healthiness of this summer to the fact that all the disease was amongst the cattle, and that the human animals escaped on this account.

It may be interesting to note here a plague of caterpillars which visited us during the months of June, July and August, literally covering the fir trees (on which they lived exclusively), and leaving them perfectly denuded of leaves. The hill sides in many places looked as if a fire had passed over the trees and scorched them. The Chinese were very much afraid to handle them, as they declared them to be exceedingly poisonous—and they are right so far, as I know of two foreigners who were injured by these insects. When crushed they exude a glutinous fluid of a light green colour, which is very irritating to the skin, producing an erysipelatous rash, which causes much inconvenience for 10 days or a fortnight.

I have only to report one death among foreigners.

Mrs B, aged 45, taken in labour with her fifth child at 1 A.M., sent for me at 11 A.M. on the same day, when I found her in labour with feeble pains, head presentation just within reach of the finger, os beginning to dilate, about the size of a sixpence. She was lying down on my arrival. Pulse good. I had delivered her of her fourth child three and a half years before, at full time, without any difficulty. Since then, though she had never been actually sick, she had suffered considerably from rheumatism in her legs, and led a very sedentary life, seldom even moving about her house, and almost never going out of it. She had not been confined to bed nor had she sought my advice for her rheumatism, which she fancied was connected with her time of life. She had menstruated very irregularly for some time. She was a very short, florid woman. The pains became strong, and the os fully dilated in the course of the day. At about 10 P.M., as the head was making little or no advance, and the pains growing feeble, while the woman was getting exhausted, I made a careful examination of the pelvis, and found the bony outlet very much contracted from side to side. At this time she was getting very low, pulse rapid and weak, constantly bringing up wind, but not vomiting, quite conscious, and complaining of much abdominal pain. I had given her beef-tea through the day, and now gave her beef-tea and brandy every half hour. As I had no instruments with me but a short forceps, and I feared I might be unable to deliver the head by version, I obtained Dr LYALL's assistance at 6 o'clock on the following morning, having in the meanwhile administered chloroform almost constantly, and given milk and beef-tea and brandy at intervals. Before Dr LYALL's arrival the pulse was very rapid and hardly distinguishable, respiration laboured, and uterine action almost altogether arrested, while the head was barely within reach of the finger. We turned and got the feet down with little difficulty, but it was only after much trouble that we succeeded in extracting the arms. The head could not be got to move, and we were obliged to break it up before we could deliver it. The measurement of the pelvis was about 3 inches from side to side, and somewhat less in the antero-posterior diameter. 10 minims of solution of ergotin in glycerine was injected into the buttock as soon as the head was delivered, and steady pressure was kept up over the uterus with the hand. In 15 minutes I introduced my hand and took away the placenta, and then five minims more of the solution of ergotin was injected into the abdominal walls. The uterus contracted fairly well, and there was no hæmorrhage. The version, craniotomy and extraction of placenta occupied three hours, and at 9.30 A.M. a binder was put on, and $\frac{1}{4}$ grain of morphia.

injected into the arm, after which the breathing became regular and steady, the uterus remained contracted, and the pulse became somewhat fuller, though it remained rapid and fluttering. During health this woman had a very feeble pulse, which I could hardly make out at any time. I counted the heart, 160 beats in a minute. Brandy and beef tea were given her every half hour, and she was conscious when she was roused to get them, though during the intervals she lay in a stupid state. She remained conscious till 1 P M, when she rapidly sank, and died at 3 o'clock the same afternoon.

The births have been six three boys and three girls

I —Dr W A HENDERSON'S Report on the Health of Ningpo for the Eighteen
Months ended 30th September 1880

DURING a residence of eighteen months in Ningpo, I have been very much struck by the absence from amongst the members of the community of the habitual deposit of urates in the urine—the condition termed lithuria,—whereas during a long residence in Chefoo, I found it frequently existing amongst the foreigners. This pathological difference between the two localities led me to make inquiry of an individual who had removed from Chefoo to Shanghai, and who had formerly been very much subject to the deposit. As to his present state, he told me that after the change of locality he became entirely free from it, even after moderate excesses in diet. In Chefoo he had, like others similarly affected, to exercise the greatest caution in regard to diet, as any strain upon his liver was at once followed by the deposit. In those subject to lithuria, as a rule the deposit immediately appeared after the consumption of an immoderate amount of any article of diet, solid or liquid, with the exception of two, in which excess would be difficult, viz, bread and water. From another individual who had resided in Chefoo I got a like experience. Previous to his taking up his abode in Chefoo he had not been troubled with the affection. After residing there for some time he lost weight considerably. This he was able to gain in part when in full exercise, but it was lost again when the exercise was relaxed. Now, with change of residence to the south, he has recovered his original weight. A third individual, with a strong tendency to lithuria, was compelled periodically to seek temporary refuge in a moister climate, and invariably returned in a state of vigour, which he could not otherwise have attained. A fourth was so affected with lithæmia that his medical adviser ordered him to leave Chefoo, and the change was followed by the happiest results. The explanation of the presence of the deposit in the one locality and its absence in the other seems to be found in the difference between the two climates, the northern being dry and the southern moist. As the hygrometry of both ports has been neglected, we are left to form a notion of their relative humidity from the mean daily range of temperature. BUCHAN states that “the daily range is least in wet climates and in temperate climates. Hence it is less in Ireland than in Scotland, greater in England than in both these countries, and still greater on the continent of Europe.” The mean daily range at Chefoo for the year 1879 was 17° , that of the previous year was 16° . These figures are not obtained by unusual dryness during a few months and corresponding dampness in others, but by a general monthly approximation to the average. During a couple of varying months each year, it rises as high as 20° . In the month of June 1876, the year of drought, it was 26° . During 1878 and 1879 the lowest monthly range was 12° . In Ningpo the range has not been observed since 1872 and 1873. Previously it had not been noted. The mean daily range of those two years was 9° . In Ningpo the highest monthly ranges are about 13° , and the lowest 5° . It is thus seen that Ningpo has about half the range of Chefoo. To these figures several objections—amongst which is that they are the difference between the mean of the coldest and the mean of the warmest of the 24 hours—might be made, but unfortunately they are all that can at present be

offered on the subject. Chefoo may be regarded as bracing or exciting, according to the degree of dryness, and Ningpo as sedative or relaxing, according to the presence or absence of excessive humidity. Judging from what I have stated, there appears to be some causal connexion between the tendency to lithæmia in Chefoo and the dryness, and, on the other hand, that the heat and moisture of Ningpo is not only non-conducive to the development of the lithæmic state, but perhaps favourable to the relief of the morbid condition. MURCHISON,* in his lectures on functional derangements of the liver, does not discuss the question of climate either in relation to the production or cure of lithæmia. Dr GARROD,† in his work on gout, which disease is a result of lithæmia, while giving its usual recognised causes, mentions the frequent summer immunity from gout, but does not state whether it is most influenced by moist or dry air. In my experience of Chefoo, the tendency to the lithate deposit existed during the dry heat as well as during the dry cold, and throughout both seasons the same caution was necessary. In Ningpo there are several individuals who I am sure would be unable to bear the strain of Chefoo unless living in the plainest possible way, but residing as they do in the more southern climate, they have a greater range of diet, and not merely with regard to food, but they can indulge in alcohol and tobacco in a way in which it would be difficult for them in the dry and stimulating atmosphere of Chefoo. Not that I believe it would be difficult to produce lithæmia, and ultimately gout, in the individuals in question, as we know that this disease has been produced in all climates wherever there has been in diet continued nitrogenous and alcoholic excess. As to the rationale of the connexion between lithæmia and the climates mentioned, the following appear to me to be at least a few of the possible links in the chain of causation. As a dry atmosphere may affect the lithic acid diathesis through elimination, oxidation, and the circulation, to each of these modes it would be well to separately refer.

1st Elimination.—Of the three, this is the most evident. Urea in health is almost solely eliminated by the kidneys, the fractional amount thrown off by the skin may be practically disregarded. Now a less amount of fluid passes through the kidney in a dry than in a moist climate, owing in the former to the greater relative activity of the lungs and skin. From the lungs of those who drink in dry air, the dry air quaffs large draughts of water, giving rise to deliciously exhilarating feelings. Not only does dry air rob the blood of its water by the lungs, but also by the skin. Perspiration is less sensible in the dry than in the moist climate, yet we know that it is greater, the dry air rapidly carrying it off as it is formed. On the contrary, the moist climate checks evaporation from both of those organs. Hence, in those who have the minimum amount of renal tissue, after any excess in diet there will be a tendency to retention of waste albuminous matters, owing in the dry climate to the minimum elimination of fluid by the kidney. In such individuals, it is of the highest importance that there ever be a due amount of water passing through the Malpighian tufts for the sluicing of the tubular epithelium.

2nd Oxidation.—PARKES,‡ in his work on hygiene, mentions, without comment, an experiment of LEHMANN'S on pigeons, which when placed in moist air exhale carbonic acid in larger quantity than in dry air. This implies increased oxidation, which is facilitated by a

* *Functional Derangements of the Liver*, by CHARLES MURCHISON, M D, LL D, F R S

† *Gout and Rheumatic Gout*, by A B GARROD, M D, F R S

‡ *Manual of Practical Hygiene*, by E A PARKES, M D, F R S

more dilute state of the substances to be oxidised. It is to be remembered that birds eliminate waste albuminous matters in the form of uric acid. From the above it might be inferred that the blood of birds has a high specific gravity, but on referring to experiments upon this point, we find that while the blood of the duck and the fowl is a little above the average specific gravity of that of man, that of the pigeon and the raven is lower. Then in examining the relative amounts of the corpuscular and plasmic parts of the blood, it is found that the former is much less in the owl than in man, but much greater in the vulture. From these different conditions of the blood the common state lithuria is not to be inferred, and further, from these we would be inclined not to look so much to the blood as to the tissues for the explanation of the phenomenon. Urea is generally admitted to be formed principally in the liver. Conceive an individual with the minimum amount of hepatic tissue necessary to health, and supply it with less than the amount of fluid necessary to complete oxidation, and the result would be suboxidation with its attendant lithates. This would be especially the case after an excess in diet.

3rd The Circulation—This is the least evident of the three modes, and upon it I would not lay much stress. Dry air increases the rate of the blood by its *vis a fronte* effect. This stimulation may tend in the lithic acid diathesis, especially when the vessels are of large calibre, to local reaction. Occasionally associated with lithuria, I have observed that the vessels are large. One case that came under my notice well illustrates to my mind the effect of such an atmosphere as Chefoo upon a weak circulation that may be brought under its influence for a lengthened period. The individual in question had no tendency to lithæmia, nor were the vessels of undue calibre, but the capillary walls were thin, and the heart weak, though there was no disease, cardiac or otherwise, generally termed organic. Continued residence in this case was followed by general anasarca. Removal to a moist climate in the course of a couple of months gave rise to diuresis, with return of the body to its normal size.

It is here worthy of notice that Dr. WATSON of Newchwang, in an early number of the *Customs Medical Reports*, well described the effect of the climate of North China on the nervous system. Lest it be thought that an undue importance is attached to the question of climate, I would distinctly state that it is simply here regarded as an element in the complex cause, of which the principal factors are dietetic errors, together, it may be, with some hepatic defect, either smallness in the amount of the glandular tissue, or of an inherited or acquired character. I would further guard myself by pointing out that my remarks as to the effects of climate on lithuria apply only to long residence, and not to the short stay made by summer visitors to Chefoo. In the case of the latter, great range of temperature simply means cool nights and the possibility of refreshing sleep, and the dryness of the atmosphere is the best remedy for systems poisoned by the muggy, mildewy, and malarious climates of the south. Nor do my remarks apply to the majority of the residents in Chefoo, among whom are to be found splendid specimens of humanity, with livers equal to any festive occasion, and who will be able to enjoy their champagne and their champagne atmosphere to the close of the natural term of mundane existence.

In Ningpo, if the effects of uric acid are not so apparent, there is another poison, Malaria, of which the consequences are much more extended in range, and of a more dangerous character.

To enumerate the results of lithæmia in Chefoo, we would be compelled to run down in part the gamut of diseases given by MURCHISON, but to attempt the description of the effects of malaria in Ningpo, we would find before us a task of still greater extent. Ningpo is situated on the banks of a river, 12 miles from the sea. It is surrounded by an alluvial plain nearly encircled by hills. The plain has a diameter of about from 20 to 30 miles. It is intersected everywhere by canals and irrigating ditches for the cultivation of rice, of which the fields are kept flooded with water from June to the end of September. Here are the conditions favourable to the development of malaria, and its protean forms are everywhere around us manifest. Amongst a few of the malarial disorders may be mentioned neuralgia, recurrent diarrhœa, enlargement of the liver and spleen, anæmia with subnormal temperature, and fever, intermittent and remittent. Of ague is to be seen the quotidian, tertian, and quartan types, but principally tertian.

During the last hot season, but few of my patients have escaped fever. Among them there has been but little diarrhœa and no dysentery, where during the previous hot season the converse obtained,—little fever, but a considerable amount of diarrhœa. This comparison is interesting, as the hot season of 1880 has been cool and moist, while the hot season of 1879 was hot and dry for Ningpo. The thermometer for the four months, June, July, August, and September 1880, shows a mean maximum of $81^{\circ} 2$, and a mean minimum of $75^{\circ} 3$. The difference, $4^{\circ} 9$, indicates in a measure the amount of moisture. The Customs noted during that period rainfall on 53 days, and that in June the prevailing winds were from the south. In July and September they were variable, and in August from the north. In striking contrast are the meteorological returns for 1879. For the corresponding months the mean maximum was $85^{\circ} 5$, the mean minimum was not accurately noted, but was proximately 77° . Rain fell on 28 days, and the prevailing winds were southerly.

The fever that has prevailed amongst the foreigners has been of the remittent type. In some it begins with a low temperature of from 99° to 100° , in others of 102° , and in a third class from 103° to 105° . As I have found all the forms amenable to treatment, without resorting to change of air, I am unable to describe the course they would naturally take if left to themselves. However, two cases in which the temperatures were low came under my notice. The cases were not subjected to treatment, and ran on for six weeks. Further, I have heard of a number of cases continuing for fully that length of time. Last year I watched one case of the lowest form in which the temperatures varied from 99° to 100° , and which persisted for several months, no active measures of treatment having been resorted to. I have seen the same elsewhere in China. The sisters of charity tell me that in their experience the fever has a course of from nine days to six weeks, and rarely, though occasionally, fatal.

Though I am told that the mortality is small amongst the Chinese, when not properly treated it is to be seen inducing the disorders already mentioned. The lowest form cannot well be detected without the thermometer, and when this instrument is not used I am of opinion that it may run on for months without being diagnosed, gradually undermining the constitution, and producing, like the other forms of fever, the pallid, washed out, and miserable specimens of humanity which around us are everywhere to be seen.

During the heavy rains of June, when vegetable growth was active and the minimum amount of waste matter was in the surrounding paddy swamps, amongst the foreigners there were no cases of fever. Then in July three cases appeared, in August, eight, and from thence the numbers increased at a rapidly accelerating ratio to the middle of October, involving nearly the whole community in its tide. During October it has also been very prevalent amongst the natives, and I am told that, owing to the numbers stricken by it, in many places the crop has been with the greatest difficulty gathered. Since writing the above, it is reported that considerable numbers of the Chinese have died from the fever.

In concluding this Report, I must express my deep indebtedness to Mr WALTERS, of the Customs, for calculating for me the totals of the thermometric observations both of Chefoo and Ningpo

K—Dr ALEXANDER JAMIESON's Report on the Health of Shanghai for the
Half-year ended 30th September 1880

ABSTRACT of METEOROLOGICAL OBSERVATIONS taken at the Observatory of the Jesuit Mission at
Zikawei, for the six months ended 30th September 1880 Latitude, $31^{\circ} 12' 30''$ N
Longitude E of Greenwich, $8^{\text{h}} 5^{\text{m}} 44.63^{\text{s}}$

DATE	Barometer at 32° F	THERMOMETER		Elastic Force of Vapour	Humidi- ty	Ozone	Velocity of Wind observed hourly	Mean Direction of Wind	Total Evapora- tion during Month.	Total Rainfall during Month.	REMARKS
		Diurnal Mean Temperature in Shade	Extreme Temperature in Shade								
1880	Inch	$^{\circ}$ F	$^{\circ}$ F	Inch of Mercury	$\frac{100}{100}$	$\frac{100}{100}$	Miles per Hour		Inch	Inch	
April	{ Max	30.416	65.3	0.654	100	19.0	27.6	N $89^{\circ} 7'$ E	2.93	5.06	On the 9th, there was distant thunder at 9.30 A.M., but no storm
	{ Mean	30.062	55.8	0.356	80	12.5	9.5				
	{ Min	29.602	44.6	0.150	37	8.0	—				
	{ Range	0.814	20.7	0.504	63	11.0	—				
May	{ Max	30.075	76.5	0.925	100	21.0	29.9	S $34^{\circ} 9'$ E	3.80	3.09	Storm on the 9th, lightning on the 10th, 11th, and 12th
	{ Mean	29.860	67.7	0.530	78	11.0	9.8				
	{ Min	29.487	56.2	0.228	27	6.0	—				
	{ Range	0.588	20.3	0.697	73	15.0	—				
June	{ Max	29.972	85.3	1.048	100	17.0	18.1	S $75^{\circ} 4'$ E	3.21	3.59	Storm on the 29th, which was the only day on which lightning was observed during the month
	{ Mean	29.781	73.1	0.650	80	10.1	8.0				
	{ Min	29.474	65.7	0.275	31	5.0	—				
	{ Range	0.498	19.6	0.773	69	12.0	—				
July	{ Max	29.839	86.4	1.163	100	15.0	17.1	N $87^{\circ} 0'$ E	1.90	9.51	During the first 20 days, storms were frequent. Up to the 19th, 16 thunderstorms occurred, and four storms unaccompanied by thunder
	{ Mean	29.677	78.5	0.919	91	8.1	6.2				
	{ Min	29.430	73.3	0.677	66	—	—				
	{ Range	0.409	13.1	0.486	34	15.0	—				
August	{ Max	30.012	81.9	1.039	100	14.0	20.0	N $32^{\circ} 3'$ E	2.42	5.95	Three storms occurred, accom- panied on the 5th and 26th by heavy rain
	{ Mean	29.704	77.6	0.803	87	—	5.8				
	{ Min	29.304	70.2	0.524	51	1.0	—				
	{ Range	0.708	11.7	0.515	49	13.0	—				
Sept	{ Max	30.195	89.1	1.055	100	—	19.56	N $74^{\circ} 0'$ E	2.45	6.13	Storms occurred on seven days, sometimes accompanied by thunder
	{ Mean	29.947	75.2	0.745	85	8.5*	6.57				
	{ Min	29.800	61.0	0.425	46	—	0.62				
	{ Range	0.395	28.1	0.630	54	—	—				

* Diurnal mean

The above abstract of observations has been drawn up for me by the Rev Father DECHEVRENS, S.J. At his suggestion, English measures have been adopted, so as to render these returns more easily comparable with those from other ports

The summer was unusually mild, and no night was sufficiently hot to prevent sleep in an ordinarily well-ventilated apartment. To this must be attributed the absence of affections depending upon excessive heat, and the low death rate. Small-pox was prevalent among the shipping as late as the month of May, and cases occurred from time to time throughout the entire year. The number of cases reached its maximum in April. In May a lady and six children arrived from Hongkong, bringing whooping-cough with them.

All the children were affected, but one—a boy 5 years old—especially so. In addition to the ordinary symptoms, he presented others of extreme gravity. He expectorated blood and blood stained purulent matter in large quantity, the discharge being extremely fetid, and during one night reaching the amount of 20 drachms by measurement. The night temperature varied between 102° and 104° , and sweating was so profuse that the child's clothes had to be changed sometimes as often as three times. Food and medicine were alike vomited, but by administering concentrated nourishment and cod-liver oil (which, fortunately, he liked) immediately after every paroxysm of cough, a certain amount was retained, and wasting, though pronounced, was not so rapid as might have been expected. There was a patch of induration about 2 inches square at the base of the right lung, and largely dilated tubes there and throughout the entire lower lobe. No morbid change could be detected anywhere else. Recovery was complete after a tedious convalescence.

These children had cousins in Shanghai, who, contrary to advice, visited them once. All the cousins took the disease, but as they were carefully isolated it did not spread for some weeks. Finally, however, it became epidemic.

One well marked case occurred in a male adult, in which the history of infection was clear. The catarrh, paroxysmal cough, and vomiting left no doubt as to the nature of the affection, although its extreme rarity after childhood made me at first incredulous.

Several cases of measles were observed, but the disease did not become epidemic. It will be noticed that in one instance death occurred in an adult, in whom, according to the certificate, the affection was of the hæmorrhagic or "malignant" variety.

Measles in Shanghai does not conform to the English type. In several cases among foreign children which fell under my observation, the eruption was precocious or tardy in appearance (second to seventh day of the fever), frequently presenting itself on the wrists and chest before coming out on the forehead, fugitive in character, vanishing once and sometimes twice for 24 hours at a time, and then reappearing, lasting occasionally as far as the tenth day (twelfth to seventeenth day of the catarrh), and generally followed by branny desquamation. In other respects there is little or no difference to be remarked. The fever is perhaps somewhat higher at night than is observed in uncomplicated English cases. In one instance where there was nothing to note in the condition of the lungs, I found a temperature of $104^{\circ}5$ at 11 P.M. This was on the third day of the fever, and immediately after the disappearance of a rash which had mottled the trunk and forearms during the afternoon. The rash was abundant on the face next morning, and the temperature had fallen to 101° . It is possible that in some of these cases an intercurrent access of malarial fever disturbs the regular evolution of the symptoms.

The multiform modifications imposed by acute or chronic malarial saturation on the natural course of specific diseases deserve careful study, as also do various independent typhoidal conditions hitherto undescribed, which occasionally end in death, and which are in all probability manifestations of acute malarial poisoning. To include them the application of the term "malaria" may require to be widened so as to include the vehicles of poisons other than that or those productive of the group of affections now classed as malarial. There can be

little doubt that we are already within sight of a new and scientific general pathology whose foundations will have been laid in those investigations into the history of blood parasites and of aerial and soil germs which are being ardently pursued all over the world, and in China notably by MANSON of Amoy. Those investigations will doubtless bring to light the causes of such cases as I refer to below, in which a non-traumatic septicæmia of unknown origin was accompanied by the gastro-enteritis described by BERGMANN as existing in artificial septic poisoning. Hitherto I have observed these typhoidal conditions only in young male adults newly or lately arrived, but I have heard of other instances which prove that neither sex, nor age, nor duration of residence is a necessary factor.

Two cases have recently been under my care, one of which I saw shortly before death, while the other I had an opportunity of watching from the beginning. The symptoms were those of profound blood-poisoning—depression, rapid exhaustion, variable but never high temperature, profuse sweating, yellow staining of the skin, night delirium (sometimes tranquil, at other times wild), transudation of altered blood through all the mucous membranes except that of the mouth, profuse stools, discharged without pain or straining, and consisting of broken down blood without any tendency to coagulation, but containing here and there a small black or crimson clot, scanty bloody urine, laden with urates, expelled with difficulty, persistent vomiting, occasionally tinged with blood, epistaxis, and frequent expectoration of blood-stained mucus, without, however, any true hæmoptysis. In neither of these cases was there distension of the abdomen or gurgling or pain in the cæcal region. In neither was there any exanthem until, in one case three, and in the other two, days before death, when a mottling of petechiæ resembling the typhus rather than the typhoid rash appeared on the abdomen. There were no sordes on the mouth, nor was there swelling of the gums. In neither were there any chest symptoms other than those of congestion of the lungs. In neither was there any sensible enlargement of the liver, and in one only was there a slight increase, to the extent of about an inch below the costal border, of the splenic dulness. These cases were treated with hot cataplasms to the abdomen kept on night and day, and internally, quinine, ergot, wine, lemon and orange juice, and occasional small doses of salines, with concentrated nourishment, but in neither did any benefit result from the treatment adopted.

Two deaths from cholera are reported, but there was no epidemic of cholera or of choleraic affections, although, as usual at the approach and during the continuance of hot weather, a large mortality among native residents was announced. The cause of this yearly recurring mortality is only vaguely described, but the symptoms enumerated point to excessive consumption of more or less unripe or decayed fruit and vegetables, exposure to the direct rays of the sun, and the absorption of malarious and other poisonous exhalations from the soil, which are condensed in the dark, filthy, crowded and unventilated ground floor rooms in which multitudes of Chinese habitually sleep*. One of the fatal cases of cholera occurred in my practice.

* When one considers the miscellaneous but always filthy food consumed by pigs in China, and the large extent to which pork enters into the diet of natives, when we consider also the fact that not only ordinary cooking, but smoking, pickling, and even saturation with chloride of zinc solution are inoperative to destroy the larvæ of *Trichina spiralis* when encapsuled in muscle, it is not unreasonable to suppose that many of the cases of rapid death, with symptoms of collapse following on pain of a rheumatismal character, and accompanied by sweating, ascites, diarrhoea and vomiting, which are every summer reported as occurring among the natives, are due to trichinosis. A case of this kind was brought into the Gutzlaff Hospital last August, and died a few hours after admission. By no amount of persuasion could I prevail on the relatives to allow me to take a specimen of the muscles, and therefore the diagnosis must rest doubtful. Two other members of the patient's family had died a few days before with the same symptoms, which had extended in one case over three weeks and in the other over four. The man brought to hospital was reported to have been ailing for about a month, and his illness, it was said, began with violent pain and swelling of the abdomen.

The patient, who had, as far as I could ascertain, been previously healthy, suddenly complained, while sitting at his desk, of slight malaise. He rose, but immediately fell in a condition of deep collapse. I saw him 20 minutes later. He was then conscious, bathed in perspiration, and quite cold. His tongue was cold, lips and nails blue, and the temperature in the rectum was below 95° (the lower limit of graduation on the thermometer I used). There had been one paroxysm of vomiting before my arrival, but neither then nor subsequently was there any purging. The vomit consisted chiefly of food eaten a few hours before. The pulse was insensible, and it was with difficulty that the contractions of the heart could be perceived with the stethoscope. They were regular at 110 per minute. Urine was totally suppressed. An hour later, under appropriate treatment, the pulse had become perceptible, but the temperature did not rise. Death occurred six hours after the onset of the disease. I was told subsequently that the patient had been away from home during the greater part of the previous night, but as nobody knew where he had been, it was impossible to trace the history of his attack. There was no postmortem.

BURIAL RETURN OF FOREIGNERS for the Half-year ended 30th September 1880*

CAUSE OF DEATH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	TOTAL
Small pox	1†	2					3
Measles				1†			1
Pernicious fever					1		1
Cholera						2	2
Dysentery						1 f 1	2
Erysipelas			1†				1
Septicæmia				1			1
Phthisis pulmonalis		1†	1 1†		1†	1	5
"Phthisis of lung and kidney"					1		1
Pneumonia			1†	f 1			2
Capillary bronchitis				1‡			1
Disease of heart			2				2
Apoplexy	1						1
Gastritis						f 1§	1
Cirrhosis of liver			1				1
Infantile cholera						f 1	1
Albuminuria		f 1					1
Bright's disease			1				1
Cirrhosis of kidney				1†			1
Abscess	1‡						1
Drowned				3†	1†	1†	5
Murdered				1			1
Suicide					1		1
Uncertified		1					1
TOTAL	3	5	8	9	5	8	38

* Not including deaths among the Catholic religious bodies

† Not resident

‡ Infants 1 year old

§ Infant 17 months old

|| Infant 6 months old

In addition to the above, 2 infants were stillborn. If we strike out 7 deaths from accidental causes, there remain 31 ascribed to disease. Of these, 4 occurred among infants, and of the 27 remaining, 8 were furnished by non-residents. The mortality among adult foreign residents is thus reduced to 19 for the half-year—16 males and 3 females,—as against 23 males and 3 females during the same period of 1879. But as our interest is chiefly with the exotic white population, these figures are to be still further reduced in order to represent the mortality among white persons born in European countries, including of course the United States of America.

MORTALITY among ASIATIC and other NON-EUROPEAN FOREIGNERS

Apoplexy	native of Macao	Pneumonia (female)	native of India
Albuminuria (female)	" "	Small-pox	" Manila
Disease of heart	" Peru	Cirrhosis of liver	" "
Phthisis	" India	Uncertified	" "

Eight cases in all The mortality among the imported white adult resident population was therefore 11,—10 males and 1 female

CAUSES of DEATH from DISEASE among RESIDENT EUROPEAN ADULTS,
April to September 1880

Small-pox	1	Septicæmia	1
Pernicious fever	1	Phthisis	2
Cholera	2	Disease of the heart	1
Dysentery	2 (1 female)	Bright's disease	1

CAUSES of DEATH from DISEASE among the CHILDREN of RESIDENT EUROPEANS,
April to September 1880

Abscess	1
Capillary bronchitis	1
Infantile cholera	1 (female)

One female infant (parents natives of Macao) died of gastritis during the same period.

CAUSES of DEATH from DISEASE among NON-RESIDENT EUROPEAN ADULTS,
April to September 1880

Small-pox	1	Erysipelas	1
Phthisis	3	Cirrhosis of kidney	1
Pneumonia	1	Measles	1

The case of septicæmia was one of peculiar interest With Dr PICHON's permission, I take his account of it from his recently issued *Report on the Medical Branch of the French Municipal Service for the year 1880* —

Mr CHARRIER was called on the 3rd January 1880 to visit a cow standing in a shed on the French Concession, and which had reached the last stage of typhus While he was examining its mouth the animal coughed violently, spattering his face with a fetid discharge A portion of this matter entered his mouth, and the stench which it emitted provoked during some 10 minutes uncontrollable attempts at vomiting Returning home, M^r CHARRIER washed his mouth with brandy, hoping thus to escape danger But it was too late, the poison had already entered his system Next day sharp pain attacked his mouth and head, which soon became so severe that, attributing it to dental neuralgia, he had the two posterior upper molars on the right side extracted Instead of obtaining relief from this operation, he found all the symptoms gaining in intensity, and at length on the 17th he sought my advice

By this time, 14 days after inoculation, the disease had made considerable progress The right cheek was much swollen, the saliva was thick and stringy, and the breath fetid As these symptoms are common to all forms of stomatitis, I might have attributed them to mere dental disturbance, were it not that the interior of the mouth revealed a condition of things of far from usual gravity On the right side,

the anterior pillar, the gums, and the outer border of the tongue, where it came into contact with the teeth, were covered with scattered ulcers in various stages of development. Some presented a bright red border with a greyish white centre. Over others a white exudation had spread, which entirely concealed them. Others, again, were completely gangrenous. In spite of all this, the glands were but little affected, and there were no general symptoms.

I proceeded to cauterise the parts with a mixture of fuming hydrochloric acid and honey, but the application was only partial, as the swelling hardly permitted the patient to separate his jaws. I ordered chlorate of potash in large doses, and for local use "coal-tar saponiné" with carbolic washes. In some days there was evident improvement, the spots reached by the acid became clean, and lost their greyish hue, and I was hoping that the lesions had been arrested in their progress, when they manifested themselves afresh, especially on the left side, and with greater intensity, as though they were the result of a new infection. Every symptom became aggravated, while the breath remained indescribably fetid. Salivation was so abundant that the patient could not lie down, but was forced to remain in a sitting posture all night, lest the saliva should suffocate him. He complained of severe pain, which seemed to have its seat in the interior of the maxilla. The true gangrenous stage now set in. The greyish patches sloughed, and the sloughs separated very slowly, leaving behind stationary ulcers, which, instead of healing, developed a white false membrane so closely adherent by its attached surface that it seemed to occupy the entire thickness of the mucous membrane. When destroyed by hydrochloric acid, it reappeared next day. In two months the disease advanced by successive outbursts, penetrating each time more deeply into the tissues. The areolar membrane of the walls of the mouth was next attacked. An indurated nodule would form in the substance of the cheek, would invade the mucous membrane, and, becoming attached to it, would impart a scirrhus hardness to it. For about three weeks no active pathological change would occur in these indurated regions, but then mortification seized the patches, and, advancing from within outwards, cast off day by day sphacelated pieces, producing a cadaveric odour and a putrid and bloody discharge. Under these infective conditions, fever soon lighted up, and those general symptoms were manifested which betray profound blood change. The pulse was small, frequent and irregular, the skin was dry, but the temperature was not excessive. From time to time there were attacks of profuse and fetid diarrhoea. The patient's exhaustion was increased by nightly recurring attacks of facial neuralgia, which deprived him of sleep. So painful had become the muscular movements needed for speech that writing took the place of speaking, and the act of swallowing caused so much suffering that nourishment could only be administered in very small quantities.

To combat this profoundly adynamic condition, I ordered wine and quinine under every imaginable form, while I gave carbolic acid internally, with a view to neutralise the evil effects of the decomposing fluids which reached the stomach.

At length the advance of the mortification was arrested, and the ulcers healed, but the extensive loss of substance now produced grave trouble. The teeth were left bare, the periosteum was exposed at various points of the alveolar borders, while superficial necroses gave rise to suppuration, which maintained the mouth in an extremely fetid condition. The folds of mucous membrane corresponding to the angles of the jaw were replaced by scar tissue, which fixed the lower jaw almost immovably, and every attempt to separate the jaws produced unbearable agony. Mr CHARRIER left hospital early in April. The mouth affection was cured, but his extreme weakness, and the smallness and frequency of his pulse, testified to the poisonous action exerted on his entire system by the absorption of putrid substances. For some weeks there was obvious improvement in the general condition, strength increased notwithstanding the difficulties which in consequence of the ankylosis of the jaw lay in the way of suitable nourishment, but the patient, who was not very obedient, soon deviated from his instructions, and anaemia reappeared, with all the train of symptoms indicative of hectic fever. He lived miserably for two months longer, and died on the 18th July.

The following conclusions flow from the history just related —

The salivary secretion of a cow suffering from contagious typhus produced, by its direct action on the buccal mucous membrane of a human subject, a specific disease marked by a specially gangrenous tendency

This secretion therefore contained a virus endowed with the power of originating the pathological process described

The affection did not declare itself by ataxo-dynamic symptoms following quickly on the development of the local lesion—thus contrasting with malignant pustule

The patient was not killed by the malignancy of the local lesion, but by septic poisoning due to long continued ingestion of hurtful substances

Were I to seek a place for this disease in the common classification of inflammatory affections of the mouth, I should couple it with diphtheritic stomatitis. With this it has a greater number of characters in common than with any other, but it is separated from it by its greater malignancy, inasmuch as it invades not only the entire thickness of the mucous membrane, but also the alveolar tissue of the mouth walls

Dr PICHON relates this case in connexion with an account of the epizootic among horned cattle which, appearing in November 1879, prevailed for several months in the settlements —

In the reports submitted by M^r CHARRIER, in his capacity of Inspector of Markets, the commencement of the epizootic was traced back to the 7th November 1879. The first case that he had under observation was a heifer imported from France. The scourge spread rapidly through the sheds on the French Concession, whence it invaded the English Settlement, proving disastrous at the "Farm," where 122 head of cattle were lost within a few weeks

I take the opportunity of enforcing the recommendations with regard to the boiling of milk which have often been offered in these Reports by quoting the remarks with which Dr PICHON closes his account of the epizootic of 1879-80 —

Most authors are silent as to the quality of the milk yielded by cattle during the prevalence of epizootics. It is possible that experience has not as yet supplied sufficient ground for its condemnation, and it is true that while a diminution of milk secretion is usually an early symptom in almost all diseases of the cow, complete suppression of that secretion accompanies any aggravation or prolongation of disease. The source of danger is thus removed by the operation of natural causes, and the discussion is narrowed to the question whether milk secreted at the very onset may not have acquired hurtful properties. In this state of uncertainty, which has not been cleared up by any authority on hygiene, the precaution of boiling the milk should be adopted. Boiling destroys any infective germs that it may contain

For the following interesting case, I am indebted to D^r L VINCENT, of the French navy, médecin-major of the *Champlain*. Although the facts reported occurred during the winter half-year, they may fitly find a place here —

Gunshot Wound of the Trachea, Cure—On the 10th November 1880, a detachment of sailors from the corvette *Champlain* was engaged in rifle practice at the range on the Hongkew Settlement at Shanghai, when the certificated marksman, P, one of the marksmen posted in the mantlets, was struck by a ball, and immediately fell. His companion having signalled the accident, firing was stopped, and the officer in command, along with D^r GANIVET, assistant-surgeon in charge of the party, hastened to the spot. They found P lying in a state of unconsciousness, with a wound, measuring about 1 centimetre in extent, situated in the middle line of the neck in front. Dr GANIVET, before making a careful examination of the wound,

endeavoured to restore the patient's consciousness, in which he was quickly successful. P showed by signs that he experienced great difficulty in breathing, and while doing so he was seized with a violent paroxysm of cough, during which he expelled a flattened piece of a Chassepot bullet, accompanied by a considerable quantity of blood. The fragment, which was of irregular shape, measured about 1 centimetre in length by 3 or 4 millimetres in thickness, and had reached the mark by rebound from the target.

Having rapidly cleansed the wound, through which air was freely passing, the assistant-surgeon applied a temporary dressing, placed the patient in a carriage, and removed him to his ship with every possible precaution and without accident. A minute examination was now made under favourable circumstances, and it was found that the lesion was situated transversely almost immediately below the cricoid cartilage. The edges were almost as clean-cut as though the wound had been made with a sharp instrument, but they were smeared with earth and sand which had clung to the projectile. A probe passed easily through the wound into the trachea, and by this exploration I assured myself that no foreign body was present, and that the posterior wall of the trachea was uninjured. The tube had been opened on its anterior aspect, and in the interval between the first and second rings, but only to the extent of the skin wound. At each expiration a hissing sound, audible at a considerable distance, was produced by an escaping through the wound, and for a certain extent all round the latter the subcutaneous areolar tissue was emphysematous. Voice was preserved, but it was much subdued and markedly changed in quality.

In the fear of increasing the emphysema, it was resolved not to stitch the wound, but merely to draw its edges together with the greatest care by means of strips of adhesive plaster. These were covered with a thick layer of cotton wool, intended to exert slight pressure and to limit the extension of the emphysema. The entire dressing was maintained in position by a bandage. During the examination and dressing the patient coughed up a certain quantity of pure blood. There was, however, no bleeding from the wound, as none of the vessels of the neck had been injured by the ball. Breathing was distinct over the entire chest, but the respiratory murmur was somewhat feeble at the bases, where also there was slight dulness on percussion. Dyspnoea was intense, respirations 36 per minute, the pulse was small, compressible, and beating 60 per minute. The patient was ordered cold broth, acidulated lemonade, and 20 drops of solution of perchloride of iron (Baume, 30°). He was kept lying on his back with his head raised, and he was directed to keep absolute silence and to avoid all movement. The poor fellow had always been extremely quiet and obedient, and this contributed materially to his rapid recovery.

He passed a good night, continuing, however, to spit blood. The pulse, without rising in frequency, increased in volume. Next day (11th November), on examining the dressing without disturbing the strapping, the emphysema was found stationary, dyspnoea had decreased, but deglutition was difficult and painful. Expectoration still blood-stained, but no longer consisting of pure blood. Pulse 64, respirations 20, temperature 37° 2 (99° F). Cotton and bandage were reapplied. Medicine and nourishment as before. 35 grammes of castor oil. By the 14th November the expectoration had lost all trace of blood and consisted of mucus. Dyspnoea had greatly diminished, and auscultation revealed only a few sibilant râles on the right side. Cough had been troublesome during the night, and some difficulty in swallowing remained. The emphysema had completely disappeared. The edges of the wound were not inflamed, and union was already in part accomplished. Air, however, still passed through the diminished opening. The dressing was reapplied, and tapioea with wine and water and a mucilaginous syrup ordered. On the 19th November, cough and expectoration had ceased, the general condition was excellent, and though there was still some difficulty in swallowing, this symptom had much diminished, so that certain articles of food passed without serious difficulty. The wound was nearly closed, and was airtight. A few exuberant granulations were cauterised.

Cicatrisation was complete on the 23rd November, 13 days after the accident. The patient's voice had then recovered all its volume, and was changed neither in strength nor in quality. A very slight difficulty in swallowing remained, but this had disappeared a week later, when P resumed duty, perfectly cured.

CHINA.

IMPERIAL MARITIME CUSTOMS.

II.—SPECIAL SERIES: No. 2.

MEDICAL REPORTS,

FOR THE HALF-YEAR ENDED 31ST MARCH 1881.

21st Issue.

PUBLISHED BY ORDER OF
The Inspector General of Customs.

SHANGHAI
STATISTICAL DEPARTMENT
OF THE
INSPECTORATE GENERAL

MDCCCLXXXI

INSPECTOR GENERAL'S CIRCULAR No 19 OF 1870

INSPECTORATE GENERAL OF CUSTOMS,

PEKING, 31st December 1870

SIR,

1 —It has been suggested to me that it would be well to take advantage of the circumstances in which the Customs Establishment is placed, to procure information with regard to disease amongst foreigners and natives in China, and I have, in consequence, come to the resolution of publishing half-yearly in collected form all that may be obtainable. If carried out to the extent hoped for, the scheme may prove highly useful to the medical profession both in China and at home, and to the public generally. I therefore look with confidence to the co-operation of the Customs Medical Officer at your port, and rely on his assisting me in this matter by framing a half-yearly report containing the result of his observations at upon the local peculiarities of disease, and upon diseases rarely or never encountered out of China. The facts brought forward and the opinions expressed will be arranged and published either with or without the name of the physician responsible for them, just as he may desire.

2 —The suggestions of the Customs Medical Officers at the various ports as to the points which it would be well to have especially elucidated, will be of great value in the framing of a form which will save trouble to those members of the Medical profession, whether connected with the Customs or not, who will join in carrying out the plan proposed. Meanwhile I would particularly invite attention to—

a —The general health of during the period reported on, the death rate amongst foreigners, and, as far as possible, a classification of the causes of death.

b —Diseases prevalent at

c —General type of disease, peculiarities and complications encountered, special treatment demanded.

d —Relation of disease to $\left\{ \begin{array}{l} \text{Season} \\ \text{Alteration in local conditions—such as drainage, \&c} \\ \text{Alteration in climatic conditions} \end{array} \right.$

e —Peculiar diseases, especially leprosy.

f —Epidemics $\left\{ \begin{array}{l} \text{Absence or presence} \\ \text{Causes} \\ \text{Course and treatment} \\ \text{Fatality} \end{array} \right.$

Other points, of a general or special kind, will naturally suggest themselves to medical men, what I have above called attention to will serve to fix the general scope of the undertaking. I have committed to Dr ALEX JAMIESON, of Shanghai, the charge of arranging the Reports for publication, so that they may be made available in a convenient form.

3—Considering the number of places at which the Customs Inspectorate has established offices, the thousands of miles north and south and east and west over which these offices are scattered, the varieties of climate, and the peculiar conditions to which, under such different circumstances, life and health are subjected, I believe the Inspectorate, aided by its Medical Officers, can do good service in the general interest in the direction indicated, and, as already stated, I rely with confidence on the support and assistance of the Medical Officer at each port in the furtherance and perfecting of this scheme. You will hand a copy of this Circular to Di _____, and request him, in my name, to hand to you in future, for transmission to myself, half-yearly Reports of the kind required, for the half-years ending 31st March and 30th September—that is, for the Winter and Summer seasons.

4—

I am, &c,

(signed) ROBERT HART,

J G

THE COMMISSIONERS OF CUSTOMS,—*Newchwang, Ningpo,*
Tientsin, Foochow,
Chefoo, Tamsui,
Hankow, Takow,
Kuikiang, Amoy,
Chinkiang, Swatow, and
Shanghai, Canton

SHANGHAI, 1st August 1881

SIR,

IN accordance with the directions of your Despatch No 6 A (Returns Series) of the 24th June 1871, I now forward to the Statistical Department of the Inspectorate General of Customs, the following documents —

Observations on *Filaria Sanguinis Hominis* in South Formosa, pp 1-25

Trichina Spiralis in Chinese Pork, p 26

Notes on some Skin Diseases, pp 27-36

Report on the Health of Takow for the two years ended 31st March 1881, pp 58-70

Report on the Health of Newchwang, pp 37-41,

Report on the Health of Chefoo, pp 42, 43,

Report on the Health of Kiukiang, pp 48, 49,

Report on the Health of Foochow, pp 50-56,

Report on the Health of Chinkiang, pp 98-100, each of these referring to the year ended 31st March 1881

Report on the Health of Hankow, pp 44-47,

Report on the Health of Amoy, p 57,

Report on the Health of Canton, pp 71, 72,

Report on the Health of Hoihow, pp 73-77,

Report on the Health of Shanghai, pp 78-97, each of these referring to the half-year ended 31st March 1881

I have the honour to be,

SIR,

Your obedient Servant,

R ALEX JAMIESON

THE INSPECTOR GENERAL OF CUSTOMS,

PEKING

The Contributors to this Volume are —

W W MYERS, M B, CH M	Takow
P MANSON, M D, CH M	Amoy
J WATSON, M D, L R C S E	Newchwang
J G BRERETON, L K & Q C P, L R C S I	Chefoo
C BEGG, M B, CH M	Hankow
J JARDINE, M D, CH M	Kiukiang
T RENNIE, M D, CH M	Foochow
F CARROW, M D	Canton
E A ALDRIDGE, L K & Q C P	Hoihow
R A JAMIESON, M A, M D, M R C S	Shanghai
R G WHITE, L S A, M R C S	Chinkiang

OBSERVATIONS ON FILARIA SANGUINIS HOMINIS IN SOUTH FORMOSA

By W. WYKEHAM MYERS, M.B., Surgeon to "David Manson Memorial" Hospital

ON taking charge of the native hospital at this port (Takow) in August 1879, I immediately began to carry out the request of my friend Dr. P. MANSON, that I should examine any cases of *Filaria sanguinis hominis* that might come under my notice, with a view of investigating and, if possible, confirming the discoveries and observations made by that gentleman.

My object, then, was as follows —

1° To observe the proportion of filaria-infected patients in relation to the whole number of admissions to the hospital, further noting the external manifestations present, *eg*, elephantiasis, lymph scrotum, etc.

2° To note the periods of appearance and disappearance of the embryos from the blood of infected persons, with a view of corroborating or disproving Dr. P. MANSON's recent discoveries as to the periodicity displayed by the parasites in their appearance.

3° To account, if possible, for the disappearance of the embryos at certain hours, discovering, if feasible, whether this was final as regarded the swarm, or whether they lay dormant and adherent during certain periods in the lungs or other organs of the body.

4° To attempt by experiments on monkeys to produce conditions similar to those observed in filaria-infected men.

Such were the designs with which I entered on my investigation, but I was somewhat crippled at the outset by the difficulty I met with in getting an infected subject, and for this reason I found the efforts made with a view of attaining my aims considerably restricted.

I have repeatedly examined the blood of patients admitted on the general list, at various hours, both day and night, devoting particular attention to those suffering from malarial disease, but have as yet only succeeded in finding three filariated persons. One of these is the subject of the observations recorded below, and the other two declined to permit more than occasional examination. From these and other conditions noted and hereafter detailed, I am led to think that this state of blood infection is not common to nor favoured by residence in Formosa, and the following are my reasons for thinking so —

1° The number of patients and others I have fruitlessly examined at various hours in the day and night.

2° The almost total absence of those diseases which Dr. P. MANSON has proved to be dependent on parasitic obstruction, such as elephantiasis and lymph scrotum.

Of the former I have seen but one case, and she informs me that she contracted it "year-ago in Amoy," and has been to this hospital before for treatment, I therefore assume this is one of the cases recorded by my predecessor, the late Dr. DAVID MANSON.

The only statistics available from the native hospital date from April 1871 (Customs Reports and Hospital Records), and during that period I find upwards of 15,000 patients have been seen by Drs DAVID MANSON, RENNIE, and MYERS. The cases have been very carefully classified under their proper heads, and from these records I observe that only two of elephantiasis have been noted, and none of lymph scrotum. (I do not include the case of elephantiasis mentioned above, for, as I have stated, I believe she represents one of the two mentioned by Dr D MANSON.) From this fact, coupled with the convincing observations and discoveries made by Dr P MANSON as to the etiology of these diseases, I am strongly inclined to think that *Filaria sanguinis hominis* does not exist in the blood of the natives of this place, otherwise it would seem probable that there would have been, during the nine years reported on, very many more of those manifestations which Dr P MANSON has shown to be the results of filarial infection.

On the mainland these diseases abound, whether one takes the earliest symptoms shown by the enlarged glands, the elephantised part, or lymph-secreting scrotum. It may be asked how is it that any cases of filaria-infected blood are to be found here, if the disease has no local origin, and to this I would reply that the sufferers come from Amoy or thereabouts, as undoubtedly was the case in the only three instances I have met with. As is known, there are a large proportion of the "natives," or residents here, who are, comparatively speaking, recent colonists, coming originally from Amoy and its surrounding districts. With characteristic adherence to the place and province of their own or their ancestors' nativity, the immigrants settling here do neither themselves nor in succeeding generations become entirely separated, in mind at least, from their original locality, and it is apparently the ambition of many to return, if only for a short stay, to the spot which family tradition styles their home, hence we find, as a fact, that most of the people hailing from the mainland make periodical visits there, and even many of those who have become by length of residence apparently more closely attached to Formosa would seem to some extent to keep up this rule.

The Pepohuans and Hakkas, on the other hand, who have more right to be looked on as regular and permanent natives of Formosa, and of whom a goodly proportion attend the hospital, ought, one would think, if filarial disease was common, to present some cases, but this does not appear to be so, nor can I hear that elephantiasis or lymph scrotum is met with either amongst these people, the uncivilised aborigines, or those whom, for distinction, I will call the immigrants. Again, with such numbers coming from the mainland, where filarial infection and its consequences are known to abound, it is not improbable that some afflicted persons come over with the rest—as happened in the instances I have given,—and if the circumstances were favourable for further propagation, by this time the prevalence of the disease would have been sufficient to admit of its existence being a matter of more certainty. The woman suffering from elephantiasis had, as she said, contracted the disease when young, and at Amoy, and though she and her children and grandchildren had long been settlers here, she and they made periodical visits to the mainland, where several of their relations still lived. She told me she was a member of a large village the residents of which were more or less connected, or, to speak more correctly, were of the same clan, and though they had been a great many years settled in Formosa, and some of them born here, still they continued to consider

themselves "Amoy men" She had no filariæ in her blood, though I looked for them several times, but two were discovered in the sanguinolent lymph drawn from an enlarged inguinal gland There were no other cases of elephantiasis as far as she knew

This is in effect a similar result to those accruing from the inquiries I have made or caused to be made in other parts of the country, and although I have heard of a case of elephantiasis scroti, I am told he also traces his disease to the period of his residence on the mainland There is, however, another fact in reference to this man which may be thought to have a little bearing on the rarity of the disease, and that is, his case appears to be known far and wide, and is spoken of with wonder, which probably would not happen were the disease more common On making inquiries of the patients as to the existence of elephantiasis, I have been in more than one instance told of this case, and this by persons belonging to districts very remote from that where the afflicted man lives *

In this connexion it may be convenient if I introduce an account of my efforts to filariate monkeys, as I think the observations made on embryos after their withdrawal by mosquitos may tend to suggest a reason for the non-propagation of the disease in this island I assume that all now take for granted the fact that the mosquito plays an essential part in completing the cycle of genesis, and that if this medium is absent or incapable, the further propagation of the parasite is suspended It will be recollected that Dr P MANSON, in his search for the medium by which the canine blood filariæ attained their freedom, found that the mosquitos which nurtured the filariæ sanguinis hominis, when made to feed on an infected dog, *digested* the embryos they thus obtained, showing that if a mosquito was the intermediary host in the case of dogs, it must be a different species to that which acts as go-between in man With these preliminary remarks (the bearing of which will be seen directly), I pass on to describe my experiments on monkeys

The man from whom I obtained the embryos is a native of Amoy, at present employed as a boatman in Takow, of himself and his disease I will speak more fully further on, when I come to the observations made on him with reference to periodicity and other matters The plan I followed was to make him sleep under a large gauze-covered cage ("mosquito house"), into which, each night, were put numbers of mosquitos freshly collected from all parts of the settlement, and to whose operations he cheerfully submitted himself, being apparently quite indifferent to both their numbers and their bites Besides this, I had in the cage a breeding trough, also covered with mosquito netting, into which from time to time I put mosquito larvae got from different places, even Taiwan-fu, the capital city, 30 miles north of this As the mosquitos were matured, they flew up into their netting, from which I let them escape into the larger cage I took care to carefully cover up the breeding trough, so that none of those which had fed could return and deposit their ova For these latter I had a trough suspended in the

* I cannot help still thinking that further search must result in the discovery of the actual presence of more cases of elephantiasis, as one can hardly imagine but that amongst such numbers as are constantly coming and going to and from the mainland, some of the affected from so generally tainted a region would cross over, notwithstanding the prejudice entertained against travelling by Chinese who may be thought to be or are willing to however slight an extent, but, of course, such instances can in no way affect the supposition as to the absence of disease traceable to local influences Again, were the local influences favourable, these importations, so far from remaining inconspicuous, would, as centres of propagation, soon make their baneful presence markedly observable

darkest part of the house, and filled with water as required. I then obtained five monkeys, four of which were young, lively, and apparently in good health, but the fifth, though highly intelligent, and trained by its previous owner to perform several tricks, was phthisical, and eventually died of pulmonary disease.

As soon as the water in the cage became sufficiently covered with ova, I gave it to the monkeys to drink, and here I may state a fact which I have not seen noticed elsewhere, and that is the strong antipathy these animals have to drinking water which appears impure or in which there are objects in motion. Besides the ova, there were always numerous mosquito larvæ darting about, these the monkeys would try to remove, but finding this impossible, would jump about screaming, and, attempting to upset the dish, utterly refuse to drink. Wishing to see whether, if impelled by thirst, they would get over this fastidiousness, I took care that they obtained no fluid but that contained in the bananas on which they fed, and in the case of one animal, a male, 10 days elapsed before any water was spontaneously drunk. Driven desperate by thirst, after making many attempts to brush away the ova and catch the larvæ, he suddenly dived in his head, took two or three deep draughts, and then sprang away screaming and chattering. With the others I had commenced daily drenching, as soon as I found their antipathy insuperable, and I eventually followed the same plan with the remaining monkey. We know there is a considerable amount of fluid in succulent fruits, but even with this, the interval that elapsed before the animal could bring himself to drink the water showed how strong must have been his instinctive objection to other than pure liquid.

For more than six weeks I continued to administer the water in which the mosquitoes were daily depositing their eggs. After the first week I examined the blood of all the monkeys each day, both night and morning, but without result. In five weeks one of the subjects got fever, with cough, and died.

No signs of filariæ nor anything which could be attributed to them were found. About seven weeks from the commencement of the experiments another monkey died from pneumonia, and the postmortem was as barren of results as regards filariæ as the previous daily examinations had been.

About this time the man had to cease sleeping in my house, but I continued giving the water for a few days longer, until the mosquitoes had disappeared from the cage and ova had ceased being deposited. The daily examination of the blood, however, still continued, but as fruitlessly as before, and this I continued to carry out up to the end of the fourth month, about which time another monkey (the educated one) died. Her body I put in spirits and sent to Dr P. MANSON, who told me that he found nothing but extensive tubercular disease.

The surviving monkey is still (November 1880) well and lively, and there are no traces of filariæ in his blood.

I attach no importance to the death of the other four animals in as far as the object of these experiments is concerned, as they all died of pulmonary affections, a not uncommon occurrence with monkeys kept in captivity. I may mention here that pulmonary disease is very prevalent amongst captive monkeys in Formosa, but whether this condition is frequent amongst the animals when in a free state I am not as yet in a position to say. Every day during the time the man slept at my house I caught a certain number of goitred mosquitos,

which I kept alive in bottles and duly labelled. On examining those who had fed on the previous night I readily found several lively embryos, but at no later date could I find other than semi-digested remains, which at a subsequent stage, however, were not to be seen. I inspected great numbers of mosquitos each day, examining several specimens from the lot caught and confined at the same date and hour. Thus I feel justified in speaking with the necessary certainty as to the results of the observations I describe.

I have no doubt that in all the cases which came under my notice the mosquito was an inhospitable host, digesting where it should have nurtured. As I have said before, the mosquitos were collected promiscuously without reference to locality, and therefore I am inclined to think that if the species which entertains the man-infecting filaria were common, I should have got it, and if my suspicions are correct, then it will be readily intelligible why we have no cases of elephantiasis or lymph scrotum referred to this place, and also why the only filariated individuals I could get hold of were those hailing direct from Amoy. I purpose, if practicable, getting supplies of the desired mosquito ova from the mainland, and will then continue my experiments*.

In the meanwhile I intend trying the local mosquitos on dogs. I hear from foreigners that "worms in the heart" are a cause of canine mortality here, although I have not been able to be sure that the deceased dogs have not been imported from, or at any rate lived for some time on, the mainland.

Should it turn out that in Formosa (an island only separated by a channel 180 miles wide from the mainland, and in constant communication with Amoy) there is immunity from filarial disease, and that this is due to the absence of a fit intermediary host, then a curious addition will have been made to our knowledge of the geographical distribution of this disease and the conditions necessary for its general existence and propagation.

It may, perhaps, chance that an investigation extending beyond the limits offered by this hospital might result in detecting a few more filariated individuals, especially as such a proportion of them originally come from or often reside in districts where Dr P. MANSON tells us 1 in 108 of the population have filariae in their blood,† but anything further that can be discovered might, I am inclined to conjecture, possibly serve as exceptions, which would the more firmly establish the fact of Formosa being, from some cause or another, unfavourable at least to the reproduction of the imported disease. Of course, after only 18 months' personal experience I cannot speak with any authority, nor indeed should I have ventured an opinion did it not seem that the carefully recorded experiences of those much more able to speak on the subject than myself confirm the conclusion which my comparatively limited observations have a tendency to support.

Before passing from this portion of my paper, I should state that (speaking from memory) the only mosquitos I have seen here appear to be much larger and darker than those in which the (embryo) filaria sanguinis hominis is supported, and which, through the kindness of Dr P. MANSON, I was frequently able to see when on a visit at Amoy. At this

* I am also at present engaged in closely examining all the different species I can find, with a view to future description and classification.

† See *Customs Medical Reports*, LV, 1.

time I also enjoyed the great privilege of having many of Dr P MANSON'S discoveries personally demonstrated to me by that gentleman. I mention this to show that I have not entered on this investigation without previous instruction as to the method of procedure from the one best qualified to impart it. The benefit this is only those who have been so favoured can fully realise.

And now to detail the results of my observations for the purpose of investigating subject No 2, viz, "To note the periods of appearance and disappearance of the embryos from the blood of infected persons, with a view of corroborating or disproving Dr P MANSON'S recent discoveries as to the periodicity displayed by the parasites in their appearance."

For this purpose I was able to persuade the boatman To AH to submit himself for experiment, and although this is the only case from which I was able to get consecutive observations, still, I was at various times able to make such investigations upon two others as led me to hope that I might be justified in applying the rule *ex uno disce omnes*, and thus (subject to future confirmation) reduce the requirements of the present experiments within practicable limits.

As may be supposed, it is no little trial of a man's resolution to submit to almost hourly pricking, to say nothing of the unpleasantness of being always the subject of close observation, and, I imagine, had not To AH's association with foreigners made him understand that no harm would be done, I should have found him as refractory as the other two, whom I could with difficulty persuade to allow me to make occasional corroboratory examinations. Besides which, To AH, being in good health and doing his daily duty, seemed even more suitable than would be one of the patients, perhaps suffering from some affection that might influence the records. To AH was under more or less supervision for six or eight months, and although I only give one series of examinations, I do so because these were the most consecutive, but for all that, I from time to time was able to get him to let me tap him, thus making sure that the records I had got, and have here tabulated, were true of his condition generally. The history he gave of himself in October 1879 is as follows —

He is 28 years old, and a native of Amoy, where he resided until he was 21. From the time he was about 14 or 16 he has suffered at various periods from "fever and ague." At about the age of 18 or 20 he first noticed swellings in his groin, which, however, have increased but little, in fact, he thinks they show a tendency to lessen in size. He suffers during the hot season from sharp attacks of "fever and ague," otherwise he is in good health, well nourished, and generally fit for his work. He was not aware he had filariæ in his blood, and does not think much of the fact, although he watched the embryos under the microscope with much interest. He has visited Amoy twice since he first came to Formosa, but as his friends and relations have all died off, he thinks of permanently settling here. He does not suffer from any inconvenience whatever when pulling, even long distances, in the gig, nor does he find that he is unfit for considerable exertion of a pedestrian kind, and often accompanies his master shooting, carrying a tolerable weight all the time. Is quite willing to allow me to make the experiments explained to him, and will be glad if he can be cured of his tendency to "ague" altogether, as "then he would be quite well."

There is nothing abnormal to be seen about his scrotum or legs, and in every way he appears an athletic, well-developed man.*

* With reference to his attacks of so called "fever and ague," I must state that these are probably seizures of the characteristic ("lymphatic") fever, and differ from the malarial disease, which they resemble, in the absence of marked periodicity, there being generally a long interval between the attacks.

As to the other two cases which came under notice, they were admitted, one suffering from ague, and the second from a callous ulcer of the leg. No enlarged glands could be detected, nor any other ailment which might be attributed to filarial infection.

The blood parasites were in both cases found in considerable numbers at night, and up to about 7.30 or 8 A.M.

The blood was drawn from one or other of the fingers by slightly congesting them with a tape, and then picking the skin with a sharp needle. At least two slides were charged at each observation, the maximum "find" being recorded. My Chinese assistant (whose observations I invariably checked) had been trained by Dr P. MANSON, and had, under his supervision and direction, aided in similar work at Amoy.

TABLE I

DAILY RECORD of FILARIA EMBRYOS found in a DROP of BLOOD taken from TO AH, a BOATMAN, and of the TEMPERATURE under his TONGUE at the MOMENT of TAPPING, showing PERIODICITY in APPEARANCE of EMBRYOS

DAYS	4 A.M.		6 A.M.		8 A.M.		10 A.M.		12 Noon		4 P.M.		6 P.M.		8 P.M.		10 P.M.		12 MID NIGHT	
	No of Embryos on Slide	Temperature	No of Embryos on Slide	Temperature	No of Embryos on Slide	Temperature	No of Embryos on Slide	Temperature	No of Embryos on Slide	Temperature	No of Embryos on Slide	Temperature	No of Embryos on Slide	Temperature	No of Embryos on Slide	Temperature	No of Embryos on Slide	Temperature	No of Embryos on Slide	Temperature
1	24	°	0	°	46	°	0	99.2	1	99.4	0	99.4	0	100	48	99.4	28	100.2	35	100
2	23	99.3	32	99.1	3	99.4			1	99.1	0	100	0	100.1	29	100			114	98.4
3	39	99.1	49	98.4									8	100	25	99.4	38	99.1	41	99.2
4	49	99.1	43	98.4	7	99.2	0	98.3	0	99	0	99.4	1	100.1	35	99	94	100	45	99
5	41	98.4	32	99	6	99.1	0	99.3	0	99.1	0	99.3	0	100	20	99.3	42	99.2	34	99.1
6	45	99	41	99.1	2	99.3	0	100	0	99.2	0	99.4	0	100	20	99.2	40	99.4	38	98.2
7	36	98.4	59	99	0	99	0	99.2	0	99.4	0	99.2	0	99.4	46	99	42	99.4	28	99.1
8	40	99	29	98.4	0	99.1	0	99.4	0	100	0	100	0	100.2	7	99.4	38	100	260	98.5
9	81	98.4	28	98.3	0	99	0	100.1	1	100.1	0	100.1	4	100.1	10	99.2				
10	22	98.3	14	99	0	99	0	100.1	0	99.2	0	99.4	1	99.4	8	99	36	99.4	27	98.9
11	38	98.5	12	99	0	98.9	0	99	0	99.3	0	99.4	0	99.6	6	98.9	22	99.4	35	99
12	33	98.4	15	99	0	99	0	98.9	0	99	0	99.1	0	99.8	3	98.6	40	99	120	99
13	41	98.5	10	98.8	0	99	0	99	0	98.9	0	99.2	0	99.7	12	98.5	29	99.1	62	99
14	21	98.3	9	99	0	99	0	99.1	0	98.6	0	99	0	99.6	5	99	80	99.3	170	99.4

It will be seen that the records amply bear out Dr P. MANSON's statements. The embryos appeared regularly between 6 and 8 P.M., generally a little after 6. In the 14 observations made at 6 P.M. there were 10 blank searches, and 4 in which embryos were present. By 6.45 P.M. they had begun to appear regularly, although still in small numbers, and it was not until 7.15 P.M. that they had become numerous. By midnight they would seem to have attained their

maximum, and from that hour gradual decrease set in. In the morning they would also appear to retire between the hours of 6 and 8, which gives a period of 12 hours during which they dispose themselves. As Dr P MANSON has already pointed out, this is just the time when their liberators are in active search for food, suggesting one of those remarkable but never-failing adjustments met with all through nature.

Only on 3 occasions out of the 14 have I been able to see any embryos in the interval from about 8.30 A.M. or 9 A.M. to 12 noon, though I have diligently searched for them, sometimes charging four or five slides. All these appearances were put in at the noon examination, and on no occasion was more than one embryo present.

The temperature was taken *before* drawing the blood, so as to obviate any risk of its being affected by the operation, if perchance this could be looked for.*

It will be noticed that at the hour when the embryos return the temperature rises slightly, more than perhaps can be attributed to ordinary evening elevation. As soon as they had appeared in marked number (8 P.M.), the temperature did not go, save on one occasion (2nd day) above $99^{\circ}4$, and on 3 (11th, 12th, and 13th days) stood below 99° , at 10 P.M. it again rose, however, as four times the thermometer registered 100° , and at no time fell below 99° . At 12 midnight, when the embryos were in greatest number, the mercury appears to have fallen somewhat, as though it registered 100° once (1st day), it was 8 times at between 99° and $99^{\circ}5$, twice showing $99^{\circ}1$. Four times it fell to between $98^{\circ}4$ and 99° (2nd, 6th, 8th, and 12th days). By 4 A.M. there is a considerable fall, $98^{\circ}2$ to $98^{\circ}5$ being recorded 8 times, with the embryos in ample numbers. At 6 A.M. there is a slight tendency to rise, and from 8 o'clock onwards this is well marked.

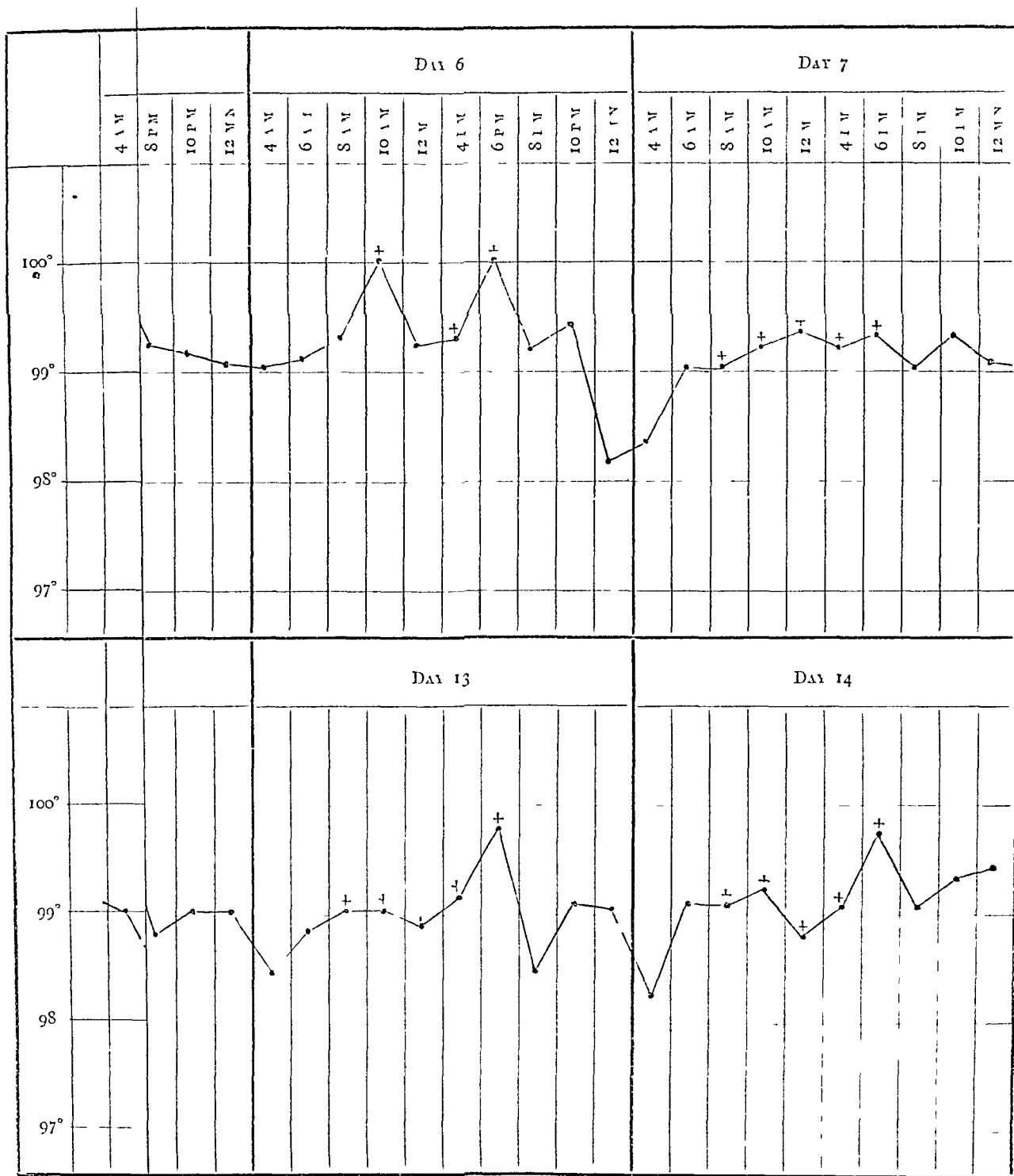
On the whole, therefore, it would appear from this case that the temperature bears no very marked relation to the number or activity of the embryos, still some influence seems shadowed forth. Of course, with observations taken from one case, and only occasionally compared with two others, these temperature results are at present of little or no scientific weight.

I have examined To AN on several occasions during the time he was under my observation, and I have found that his temperature was, as a rule, somewhat higher than normal, and tended to vary considerably in the 24 hours, this, too, at times when he had had no attack of "ague" for a considerable period, and said he felt quite well. I therefore merely offer these temperature notes for what they are worth, trusting they may tempt some one more advantageously placed for seeing a number of filariated persons to take regular observations, and prove or disprove what I can now only surmise as possible.

In as far as the observations on embryos and the periodicity of their advent or exit goes, this table may be more valuable, as it is an addition to observations taken by others, and in another locality, further borne out as it is to some extent by what I have been able to learn from the other cases, in as far as their complaisance would permit.

I next come to speak of the results of my observations on what at the beginning of this paper I put as the third object for investigation, viz., "To account, if possible, for the

* See Chart I, opposite



disappearance of the embryos at certain hours, discovering, if feasible, whether this was final as regarded the swarm, or whether they lay dormant and adherent during certain periods in the lungs or other organs of the body"

In order to do this I got TO AH once more to submit himself to examination for a series of seven days, commencing my examination at 6 15 A M, and taking observations at least every quarter of an hour until the embryos had disappeared

In the following tables I give the results, with a record of simultaneous temperature From what Dr P MANSON has written I gather that he is inclined to think the embryos do not periodically dissolve in the blood, but that they probably congregate in some organ (possibly the lungs), and there remain until the time arrives for their wanderings and withdrawal by mosquitos In favour of this view he gives the results of postmortem examinations of dogs, and, finding a great congregation of embryos in the lungs, he suggests—if analogy is thought to have any bearing on the matter—that this supports the conjecture he has advanced

I own that I am not as much influenced by this as Dr MANSON would seem to be, for (as affecting the value of the experiment) I am inclined to lay considerable weight on the fact that the embryos are never absent from the blood of infected dogs, but, on the contrary, are at all times circulating in considerable numbers For this reason it appears to me that at a postmortem examination, where the blood is in a state of stagnation, and a drop is deliberately taken from any great hæmic collection, one would naturally expect to find the embryos thus secured in directly greater proportion to the mass of blood from which they are then drawn than in the case of those escaping from a minute puncture in the smallest vessels, with the current rapidly sweeping past the opening Reasoning likewise from analogy, I should rather assume that were it possible to get a postmortem on a man suddenly killed during the night, when the embryos are in full vigour, we might expect to find the greatest concentration in a drop taken from the largest mass of blood But I should hesitate before deducing the theory that where embryos are then found most numerous, there they rest at certain periods during the life of the host

I am, however, unable to think that the two cases are sufficiently analogous, or even approximately so, as, unless we had a case where the embryos were during a certain time absent from the circulation, and in those hours found them concentrated in some large centre, we could not fairly look on the observation as in any way suggestive of the conduct of the embryos when in a condition the reverse of that solely presented by the subject under observation Again, I am inclined to doubt whether the relatively few mosquitos which can get at either dogs or men during the limited time available for their operations could make any very appreciable diminution in the myriads of embryos which must be existent in the body, and unless the parent worm either breeds but once, or breeds only at excessively long intervals, it would seem that some more rapid mode of disposing of the offspring than that offered by the mosquito would be required, in order to avoid the choking up of the vessels by the blood-displacing embryos Judging, however, from analogy as to the generative power of the parent worm or worms (for it must be remembered there may be many), one is justified in

assuming the produce to be frequent and enormous, more so than thousands of mosquitos, even if constantly at work, could manage to keep within bounds. Further, arguing on the same basis, may we not assume that nature has provided by this very excess for the security of propagation, which would be hazarded were there only a proportionate number of embryos to that of mosquitos available, herself providing means for the absorption of the residuum in time to make way for a fresh supply, which one of her equally imperative ordinances is sure to bring forth? Again, if those generated had to wait their turn in the lottery of selection, would this not seem to necessitate a condition of unusual and indefinitely limited arrest of development in the young, and of function in the parent? It is to be further noted that from both the persons used by Dr MANSON in destroying the dogs, lung engorgement is seen after death, and this would, I think, readily suggest why (the largest collection of blood remaining in these organs) the embryos should be in excess there, while, coupled with this, it is not improbable that, under the circumstances, there should be a strong local attraction for the embryos.

As may be supposed, I hesitate considerably in offering opposition to the views of so able and painstaking an observer as Dr MANSON, and in this case, if his observations had been the subject of my dissent, I should have been far more diffident in venturing to join issue with him. Here, however, I merely query the conclusions he draws from certain data, as to my mind they do not seem quite to follow the premises, and though in suggesting the possibility of diurnal solution as the end of such of the embryos as do not come within mosquito range, I advance certain observations of my own, still, as far as I know, they extend in a different direction from that previously explored, and, of course, are in turn open to be verified or shown inconstant by the subsequent investigations of those who may take the trouble to check me.

So much for theory. I will now submit the only experiments I have been able to make in reference to the matter, and, knowing how inadequate they are, both in number and nature, I can only offer them as first steps in that research for which much ampler opportunities must be afforded.

If the embryo be constantly watched after withdrawal from the body, the primary symptoms of debility visible will be its tendency to stretch itself out. At first the oval which it forms when in a state of vigour and activity will be seen to become more and more perceptibly elongated. The almost indistinguishable movements will appear more isolated, and as weakness increases, these change into a semi-undulatory action, which at the last gradually ceases from the centre outwards, until the feeble motions of herd or lash are all that remain to denote vitality. The lash becomes more distinct, and the integument puts on a somewhat shrivelled appearance. When death takes place, the embryo is seen to be extended often at full length, and generally so to a great extent. After practice it is easy to classify the embryos under the different stages from perfect vigour through extreme debility to death, and this experience may be readily gained by preserving the slides and watching the movements until life has ceased. In order to carry out the experiments I proceed to detail, it will be better to familiarise oneself with these appearances, and keep constantly refreshing the memory by comparing the embryos recently abstracted with those which by dint of keeping have been

reduced to various states of debility At least, I found this method of procedure useful, and it appeared to me likely to secure most exactitude

As will be seen from Tables 2 and 3, I commenced my observations at those hours in the morning and evening when I knew by experience the embryos would be retiring and reappearing, on each occasion examining the slide immediately on preparation, and frequently both between the intervals and afterwards (they were, of course, all labelled), and when I could persuade my subject to let me, which was not without difficulty, I tapped at periods other than and between those recorded, with a view of checking the latter

TABLE 2

MORNING RECORD of OBSERVATIONS on BLOOD taken from To AH (GIGMAN), commencing at 6 15 A M and continued until the EMBRYOS had disappeared, and of TEMPERATURE of his MOUTH

Day	6 15 A M		6 30 A M		6 45 A M		7 A M		7 15 A M		7 30 A M		7 45 A M		8 A M		8 15 A M		8 30 A M		8 45 A M		9 A M		9 15 A M		9 30 A M	
	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature
1	18	98.3	12	98.4	13	98.5	3	98.4	0	99.1	0	99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	18	98.3	10	99.1	0	99.1	4	99.2	5	99.1	4	99.1	4	99.1	0	99.1	0	99.1	0	0	0	0	0	0	0	0	0	0
3	44	98.4	9	98.4	16	99	9	98.4	26	98.2			5	98.2			7	99.2	3	99.2	2	99.2	0	99				
4	10	98.5	52	98.6	9	97.4	16	97	31	97	3	97	2	97	6	97.2	11	97.4	20	97.3	6	97.4	3	97.1	0	97.2	0	97.2
5	17	98.5	8	98.4	3	98	2	97.9	7	97	1	97.8	1	97.8	1	97.8	1	97.1	3	97.8	0		0					
6	29	98.3	10	98.1	6	98.3	0	98	1	98	4	98	0	98	1	98.2	0	98.4	0		0		0					
7	36	98.4	11	98.3	4	98.3	0	98	3	97.8	0	97.9	0	98	0	98	0	98.8	0	98.5	0	98.3	0	98.5				

TABLE 3

EVENING RECORD of OBSERVATIONS on BLOOD taken from To AH (GIGMAN), commencing at 6 30 P M and continued until the EMBRYOS had reappeared in NUMBERS, and of TEMPERATURE of his MOUTH

Days	6 30 P M		6 45 P M		7 P M		7 15 P M		7 30 P M	
	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature	No of Embryos	Temperature
1	0	0	0	0	4	99.2	14	99.2	17	99.1
2	0	100	1	100.1	5	100	24	99.4	40	99.3
3	0	100	1	100	4	99.4	30	99.5	25	99
4	0	99.8	2	100.1	6	99.3	20	99.2	25	99
5	1	99.8	4	100.2	7	99.8	15	99.3	30	99.5
6	0	99.6	2	100	5	100.1	25	99.8	27	99.4

I believe, however, that examinations made every quarter of an hour, with the occasional checks I have indicated, are sufficient for the purpose, and therefore, to avoid confusion, I have contented myself with merely noting these

The following are the notes I made, on each occasion specified, of the conditions of the embryos then seen. I would state that on two days I was fortunate enough to secure the presence and assistance of Dr JOHN DUDLEY, R.N., that days 1, 2, 3 and 4 were consecutive, but 5, 6 and 7 were taken with intervals between, that where morning and evening observations are recorded they were made on the same day, and that I have, whenever I could persuade the man to allow me, and his duties would permit, tried to verify my former experiments, but that the notes of those given are selected because they were the only ones I have so far been able to get continuously, and besides, the appearances were so very similar as to render further record unnecessary

First Day, 6 15 A.M. 18 Embryos on Slide—1st to 5th normal, 6th to 10th languid, stretched out, 10th to 14th normal, 15th weak, stretched out, body bent in distinct folds, 16th very much stretched out, weak, only lower two thirds of body appears to be moving, 18th normal

6 30 A.M. 12 Embryos—1st to 4th normal, 5th stretched out, decidedly weak, 6th and 7th stretched out, somewhat languid, and pauses between contractions marked, 8th stretched out, languid, 9th to 11th normal, 12th very weak, scarcely moving, shrivelled appearance

6 45 A.M. 13 Embryos—1st to 7th apparently normal, 8th stretched out, languid, folds in body well marked and retained during appreciable pause, 9th very weak, stretched round in circle, head only moving occasionally, 10th busier but decidedly weak, 11th and 12th normal, 13th stretched out, lash distinct and moving vigorously, upper part of body much less vigorous

7 A.M. 3 Embryos—1st very weak, stretched out, what little motion there is undulatory, 2nd more vigorous, but stretched out, 3rd normal

Second Day, 7 15 A.M. 5 Embryos—1st and 2nd extended, body movements not as vigorous as usual, and more distinctly localised, 3rd, very slight motion at lower extremities, getting less and less under observation, body puckered and shrivelled, 4th, movement only in head, stretched out body, shrivelled appearance, 5th, body stretched to full length, slightest movement of lash, which ceased under observation

7 30 A.M. 4 Embryos—1st, semi-convulsive jerks of body, the bends taking place at each movement being distinctly separated by inactive portions of body and apparently deeply indented, as though the body was more impressible, retaining the mark until the next movement took place, half stretched out, 2nd apparently as vigorous and well as usual, 3rd, movements much more sluggish, folds very slowly straightened out at each jerk, elongating itself, movements apparently involving same bends and folds of body every time, 4th much more vigorous in action, but with marked tendency to elongation, and the pauses between motions well marked

7 45 A.M. 4 Embryos—1st very feeble in its action generally, 2nd extended and markedly feeble, some signs of irregularity in action observed, 3rd lively, and apparently as usual, 4th very feeble, much stretched out, action spasmodic, with marked pauses

Third Day, 6 A.M. 29 Embryos—Many lively and apparently well, some very languid, scarcely moving, stretched out, with head and tail touching so as to form a large circle, apparently just dying

6 15 A.M. 44 Embryos—Numbers of them were as usual, but others very much debilitated, body stretched out, and movements decidedly languid

6 30 A.M. 9 Embryos—1st languid, tendency to elongate and form circle by approximation of tail and head, folds and pauses marked, shrivelled, 2nd very similar in condition, 3rd still more feeble, folds in body very marked, giving an appearance as though body would break at each movement, 4th and 5th

stretched out and moving with extreme languor, 6th *quite dead* (N B—This is the first time I have come across a dead embryo in a drop of blood freshly drawn. The slide had as usual been carefully washed and dried prior to use.)

6 45 A M 16 *Embryos*—1st very languid, stretched out, 2nd and 3rd quite stretched out, only very slight movement in head, both almost dead, 4th and 5th ditto, ditto, ceased appearance very marked. The remainder were more or less debilitated and stretched out, with the exception of two, which were quite vigorous and apparently well.

7 A M 9 *Embryos*—1st lively and normal, though slightly inclined to stretch out, 2nd stretched out in semi-circular form, decidedly weak, movement more distinctly undulatory, 3rd languid, stretched out, 4th and 5th stretched out, somewhat weak in action, 6th very feeble, movement slow and intermittent, made apparently with great effort, 7th still less active, seemingly nearly dead, 8th and 9th normal.

7 15 A M 26 *Embryos*—1st to 4th nearly normal, 5th stretched out, much more languid, 6th stretched out, very languid, 7th stretched out, with undulatory movement, 8th, movements feeble, one extremity (oral) motionless, apparently paralysed, stretched out.

7 45 A M 5 *Embryos*—1st feeble, stretched out, 2nd ditto, very weak, 3rd normal, 4th slight motion, semi-paralysed appearance, 5th normal.

8 15 A M 7 *Embryos*—1st active, normal, 2nd feeble, stretched out, undulatory movement, 3rd feeble, stretched out, 4th stretched out, activity not however affected, 5th stretched out, rather feeble, and tendency to drag lower half of body, 6th curled up, scarcely moving, 7th normal.

8 30 A M 3 *Embryos*—1st normal, 2nd stretched out, movements feeble and intermittent, with distinct pauses, 3rd normal.

8 45 A M 2 *Embryos*—1st normal, 2nd more stretched, movements less vigorous.

Fourth Day, 6 15 A M 10 *Embryos*—1st very languid and stretched round in wide oval shape, movements spasmodic, 2nd very feeble, only moving after long pauses and only at either extremity, the central portion of body being motionless, 3rd barely moving, and then only with a weak undulatory motion, stretched out, 4th stretched out, only movement in head, very spasmodic and irregular, 5th normal, 6th much extended, slow, undulatory movement running spasmodically along the whole body, beginning at tail, pauses very marked, 7th quite extended, though movement is brisker and more regular than last, 8th and 9th stretched out, slow, feeble, convulsive movement of head and tail, 10th stretched out, very feeble.

6 30 A M 52 *Embryos*—1st stretched out, action much more languid than normal, with appreciable pauses, 2nd and 3rd nearly normal, stretched out, 4th curled up, very feeble, 5th same as 3rd, 7th to 9th stretched out, very weak, 10th to 12th feeble, with spasmodic action, exhibiting distinct pauses, 13th stretched out, brisker than last, but pauses very marked, 14th stretched out and very feeble, 15th and 16th extended, feebly moving from head downwards in slow wave-like manner, getting feebler under observation, 17th stretched out, motions spasmodic, with marked pauses, 18th stretched out, otherwise normal, 19th formed in wide ring, very feeble movement of tail detected at long intervals, 20th much brisker, stretched out, 21st and 22nd, nearly normal, stretched out, 23rd motions spasmodic, slow, feeble, 24th and 25th feeble, stretched out, 26th much extended, very feeble, 27th ditto, but more brisk, 28th normal, 29th to 31st, very feeble, motion spasmodic and slow, 32nd and 33rd very feeble, stretched out, 34th and 35th normal, 36th to 40th more languid than normal, stretched out, 40th to 45th normal, 46th and 47th stretched out, very weak, 48th to 50th stretched out, nearly normal, 51st stretched out very weak, motion spasmodic and slow, with long pauses, 52nd normal.

6 45 A M 9 *Embryos*—1st and 2nd quite dead, 3rd stretched out, very feeble, 4th to 9th nearly normal.

7 A M 16 *Embryos*—1st to 4th stretched out, nearly normal, 5th and 6th stretched out, very feeble, 7th normal, 8th to 11th stretched out, feeble, 12th to 15th stretched out, very feeble, 16th stretched out, movement barely discernible.

7 15 A M 31 *Embryos*—1st stretched out, otherwise nearly normal, 2nd stretched out, very feeble, 5th and 6th stretched out and feeble, 7th stretched out, very feeble, motion spasmodic and slow, 8th and 9th stretched out, feeble, 10th normal, 11th and 12th stretched out, but motions lively, 13th to 15th stretched out, motions slow and spasmodic, altogether very feeble, 16th normal, 17th very feeble, head only moving, 18th stretched out, lower one third of body motionless, giving paralysed appearance, movements of other portion spasmodic and slow, stopping suddenly at the quiescent point, 19th stretched out full length, slow convulsive movements just discernible, 20th stretched out, feeble, with slight spasmodic motion, 21st stretched out, nearly normal, 22nd and 23rd normal, 24th stretched out, feeble, 25th stretched out, very feeble, 26th stretched out, feeble, 27th normal, 28th very feeble, formed in large ring, 29th normal, 30th stretched out, feeble, 31st stretched out, very feeble

7 30 A M 3 *Embryos*—1st and 2nd stretched out, very feeble, 3rd nearly dead, stretched out, and motion, when visible, confined to lash

7 45 A M 2 *Embryos*—Both very feeble, one much in same condition as No 3 on last slide

8 A M 6 *Embryos*—1st and 2nd very feeble, scarcely moving, well extended, 3rd to 6th very feeble, though less nearly moribund than first two seen

8 15 A M 11 *Embryos*—1st to 4th normal, 5th to 11th all in different stages of debility, stretched out

8 30 A M 20 *Embryos*—1st normal, 2nd stretched out, feeble, 3rd to 7th normal, others more or less feeble (except 18th and 19th, which were normal), stretched out

8 45 A M 6 *Embryos*—1st and 2nd very feeble, barely moving, stretched out, 3rd to 6th stretched out, feeble movements, though busier than 1st and 2nd, still materially affected

9 A M 3 *Embryos*—1st and 2nd feeble, stretched out, 3rd nearly dead, movement only observed after long intervals

Fifth Day, 7 A M 2 Embryos—1st stretched out, motions slow, spasmodic and irregular, 2nd very feeble, stretched out, folds or bends in body well marked and permanent, almost dead, movements only discernible at long intervals, body appears shrivelled

7 15 A M 7 *Embryos*—1st stretched out, feeble, movements irregular, with distinct pauses, 2nd stretched out, semi irregular, spasmodic motions, 3rd very feeble, stretched out, 4th stretched round in wide circle, only slightest visible movement, nearly dead, 5th stretched out, slow undulating movement at long intervals, very feeble, 6th stretched out, very slight movement in head only, 7th appears quite motionless and dead, but after long observation slight movement detected in lash

7 30 A M 1 *Embryo*—Very feeble, only slightest movement in head

7 45 A M 1 *Embryo*—Stretched out, very feeble, slight spasmodic movement

8 A M 1 *Embryo*—Very feeble, irregular movement at intervals, stretched out

8 15 A M 1 *Embryo*—Same as one on last slide

8 30 A M 3 *Embryos*—1st stretched out, very feeble, 2nd stretched out, busier than last but still decidedly enfeebled, 3rd stretched out, very feeble, movement irregular, spasmodic, folds or bends well marked

Sixth Day, 7 A M No Embryos

7 15 A M 1 *Embryo*—Quite dead, and shrivelled

7 30 A M 4 *Embryos*—1st very feeble, stretched out, 2nd dead and shrivelled, lower one-third of body was very transparent, and with difficulty made out, 3rd stretched out, very feeble, body corrugated, 4th stretched out, very feeble, slight movement, chiefly confined to lash

7 45 A M *No Embryos*

8 A M 1 *Embryo*—Almost dead, stretched out, with flattened appearance

Seventh Day, 6 30 A M 11 *Embryos*—1st to 5th stretched out, very feeble, 6th apparently quite dead, extended in circular form, 7th and 8th normal, 9th to 11th stretched out, and all more or less feeble
6 45 A M 4 *Embryos*—1st and 2nd stretched out, very feeble, scarcely moving, and what motion there is, confined to extremities

7 15 A M 3 *Embryos*—1st normal, 2nd stretched out and much less vigorous, motion irregular and chiefly confined to lower extremity, 3rd coiled in two loops, very feeble, irregular movement, with marked pauses, evidently in last stage of debility

The foregoing are the notes taken immediately on each slide being changed, and from the appearances therein described I think it is evident that some decided change takes place in the condition of the embryos just prior to their retirement from the circulation. The contrast with the vigorous, rapidly-moving organism seen at night was very marked. Then, the movements are almost too rapid to be distinguished, now, in the majority of cases, irregular and with distinct pauses. Then, the stretching out or extension of the body being but temporary, and apparently only with a view to alteration of position, now, is permanent, and obviously the result of weakness.

It may be suggested that these are only the premonitory signs of approaching and temporary lethargy, and that those embryos which seem to be defunct are not so in reality, but in a state wherein they remain until the mosquito calls them forth in renewed vigour for their nocturnal rambles. I am inclined to doubt that in this state any mere power of adhesion would enable them to resist the force of the blood current. In fact, if we do suppose them to congregate in any central part during the hours of their absence from the circulation, they would need to expend much energy in order to maintain their position. It would be necessary for them to work at full speed against the tide, just as the typhoon-pressed vessel is sometimes able to preserve her place only by "steaming to her anchors."

Again, I think if torpor were the state indicated by the appearances I have described, the departure of the embryos would be more simultaneous, instead of being comparatively so gradual as we find it.

Of course, in the present state of our information all must be more or less surmise, still I am prompted to think, from what I have seen, that creatures exhibiting such signs of physical debility just prior to their withdrawal from the blood are in reality approaching a condition which ends with their existence.

I have not thought it necessary to describe in detail each evening observation, for all the embryos seemed to be vigorous and healthy, exhibiting a marked contrast in condition to those extracted in the morning. As it is of great importance, in order to get reliable observations, that extreme precautions be taken to avoid injuring the embryos, it may not be out of place to allude to the consequences of carelessness in withdrawing the blood or applying the covering slide. The blood drawn should flow or spring freely from the puncture, without any extraneous aid save that afforded by the slightly constricting band previously applied to the finger. When squeezing or rubbing of the part, in order to force out more blood, was attempted, I found that the serum was separated in the drop before it became large enough for transfer to the slide, and that the embryos were invariably rendered languid in proportion to the distance to which they were removed from the corpuscles. On the slide, towards the edges, it will sometimes be found that a band of serum is formed almost free from corpuscles, or with these in diminished

number. Any embryos found here, or that may work themselves into these limits, are decidedly debilitated or become rapidly so on arrival therein. By watching the entrance of an embryo into the serous area, and contrasting its condition after deprivation of corpuscular contact with that previously observed, the effect will be more readily seen. For these and mechanical reasons, should the drop extracted be insufficiently copious to allow of the blood equally disseminating itself over the whole surface immediately covered by the upper glass, and pressure other than the weight of the covering glass be used to effect this, then the embryos will be weakened and the preparation rendered unsuitable for the purposes in view. Of course, where the mere presence of embryos is all that is desired to be proved, these precautions are unnecessary, although if it be desired to ascertain the numerical relation of embryos to as nearly certain a quantity of blood as can be estimated short of actual measurement, then I think it will be found best to so make the puncture that, as far as one can judge, the same amount of blood springs from the orifice each time. I make my puncture in the middle of the second joint of any of the fingers with a No. 5 sewing needle, and always feel the point against the bone. Done rapidly, this does not appear to cause either increased pain at the time nor irritation afterwards, and for the constriction of the finger I have found a divided india-rubber letter-band bound lightly round the first joint quite sufficient.

Knowing these risks, and with them fully before my mind, I observed the greatest care in preparing the slides which formed the subjects of my investigation into the relative condition of the embryos extracted in the morning and evening, and I can only say that if error has crept in, I have done what in me lies to avoid it, but at the same time, where so much depends on one's ability to appreciate and estimate signs almost entirely consisting of comparative degrees of motion, a single observer may easily be misled or mistaken. To obviate this risk as far as possible, I have sought the assistance of others, and thus far I have met with no difference of opinion.

The experiments first made 15 months ago were undertaken, as previously mentioned, in the presence and with the assistance of Dr JOHN DUDLEY, R.N., then of H.B.M.S. *Mosquito*, by a coincidence, my last observations were made a few days ago with the assistance of Dr MCKINLAY, R.N., of the same ship, while at the same time I was fortunate enough to secure the presence and assistance of Dr PETER ANDERSON, of the English Presbyterian Mission. To these two latter gentlemen I briefly explained my suspicions, and asked them to examine the blood in the morning and evening. I explained and demonstrated at the same time the consequences of carelessness in preparing the slides, and left them to make their own observations. They authorise me to state that, as far as this case goes (and of course none of us can go farther), they agree with the statements I have made. I have also submitted this paper to them, and they continue their support to the descriptions I have given in it of the behaviour of embryos after nocturnal and morning extraction.

In order to secure greater accuracy, I had previously instituted another series of experiments, and although I was not here able to secure the control afforded by simultaneous observations made by other professional men, still I was during the first three days fortunate enough to obtain the presence and assistance of one whose powers of observation have been considerably quickened by his studies in the field of geology and kindred sciences. I am happy

to say that this gentleman also confirms my conclusions. I allude to the Rev DAVID SMITH, of the English Presbyterian Mission, who became greatly interested in the subject, and through whose intervention I hope to obtain specimens of mosquitos from different parts of the country, as well as further information concerning the presence or absence of elephantiasis and allied diseases in the various districts he may visit in pursuit of his calling.

In order to test the longevity of the embryos after withdrawal from the body, we prepared slides, with all precautions, at 9 30 P M and from 7 45 A M. With a view of preventing desiccation, the slides were carefully oiled for a space of about a quarter of an inch round their rims, blood was then drawn in the manner before described, the covering glass (of similar size and thickness to that on which the blood lay) was then carefully adjusted, and only those preparations were selected on which the blood and its corpuscles were, as nearly as we could judge, equally disseminated. In order to ensure greater opportunities for contrast, blood was extracted at 7 45 A M and 8 A M, these being the morning hours which reference to Table 2 seemed to suggest as being the most suitable. Each embryo was carefully observed and its condition noted, and the following results were obtained. I have arranged the notes in parallel columns for facility of comparison.

MORNING SLIDES

First Day --1st Observation, 7 45 A M 12 Embryos

1st stretched out, spasmodic action, extremities more active than centre, very languid

2nd stretched out, extremities active, generally languid

3rd stretched out, almost dead, extremities slightly moving with slow undulatory motion

4th stretched out, extremities very active, motion spasmodic

5th stretched out, general movement, but less vigorous than normal, action spasmodic, with distinct pauses

6th stretched out, very weak, action spasmodic

7th more active, stretched out, pauses very marked

8th very languid, two thirds of body gyrating slowly round passive upper third, which is extended

9th very nearly normal in action, slightly stretched out

10th very languid, about two-thirds of body moving spasmodically, stretched out

EVENING SLIDES

1st Day, 9 30 P M 31 Embryos

Every one appeared to be vigorous and moving with great rapidity, presenting a "star-like appearance," motion so rapid as to be quite undistinguishable, no stretching out or other sign of debility to be seen in any of the embryos coming under observation.

MORNING SLIDES

11th stretched out, spasmodic, interrupted action, quite languid, remaining passive for some time

12th stretched out, less languid than last, though evidently weak

8 A M 7 *Embryos*

1st stretched out, very languid, one portion gyrating slowly round passive part

2nd languid, gyrating, spasmodic action, stretched out

3rd stretched out, very languid

4th stretched out in long semi-oval, very feeble

5th stretched out, spasmodic action, very languid, motion confined to extremities

6th more active than last, stretched out

7th stretched out, nearly normal action, though pauses are discernible

2nd *Observation, Preparation 12 hours old*

7 45 A M *Slide, only 8 Embryos now visible*

1st quite dead

2nd stretched out, languidly moving

3rd much the same as last

4th ditto, ditto

5th more vigorous than others

6th stretched out, but very vigorous

7th stretched out, languid

8th stretched out, much more feeble, what action there is, spasmodic

8 A M *Slide, only 5 Embryos now visible*

1st upper two thirds of body curled, and slowly moving on lower one-third, very feeble

2nd ditto, ditto

3rd stretched out, weak undulatory motion

4th stretched out, more vigorous

5th stretched out, very weak

Second Day — 3rd Observation at 9 30 P M, Preparation 36 hours old 7 45 A M Slide, 8 Embryos only visible

1st and 2nd dead

3rd wriggling itself in knots, then passive for two or three seconds, convulsively freeing itself, pausing a like time, and then repeating the process

EVENING SLIDES

Second Day — 2nd Observation at 9 30 P M, Preparation 24 hours old 9 30 P M Slide, 31 Embryos visible

All more stretched out than on previous evening, and the movements less vigorous, especially about oral extremity

Two embryos seemed less active than rest, but otherwise no very marked signs of debility

MORNING SLIDES

4th stretched out, more vigorous, spasmodic action, with long pauses

5th stretched out, much attenuated, resting by head and tail, very feebly swaying rest of body

6th head moving languidly to and fro, lower part of body convulsively strutting occasionally, but no general movement, very feeble

7th moving languidly, with undulatory motion along body, distinct pauses, stretched out to full length

8th quite dead, attenuated, transparent, and shrivelled up

8 A M Slide, 36 hours old, 5 Embryos visible

1st and 2nd dead

3rd very feeble motion in oral extremity, otherwise passive

4th ditto, ditto

5th very languid movement in both extremities

Third Day — 4th Observation at 9 30 P M, Preparation 60 hours old 7 45 A M Slide, 5 Embryos visible

1st only upper third of body present, this very transparent and attenuated

2nd lower one third gyrating slowly and convulsively round rest of body, which is perfectly passive

3rd similar appearance, though the active portion is more vigorous

4th stretched out, very feeble undulatory motion visible at long intervals

5th stretched out, slightly more vigorous

No traces of others on slide

Fourth Day — 5th Observation at 9 30 P M, Preparation 84 hours old 7 45 A M Slide, 2 Embryos visible

1st very nearly dead, motion very feeble

2nd quite dead

No others nor traces of others visible on slide

8 A M Slide, 2 Embryos visible

1st very feebly moving

2nd only about two-thirds of body present, shrivelled up and attenuated

No others nor traces of others to be seen

EVENING SLIDES

Third Day — 3rd Observation at 9 30 P M, Preparation 48 hours old 9 30 P M Slide, 31 Embryos present

All more or less stretched out, and motion more undulatory Lash in one or two instances becoming visible One very feeble, though movement was general as to the body

Fourth Day — 4th Observation at 9 30 P M, Preparation 72 hours old 9 30 P M Slide, 30 Embryos visible

All more languid than last night, but still movements in most cases very lively

Three embryos appeared specially weak, and central portion of body nearly passive, but the general uniformity of condition was very striking

MORNING SLIDES

*Fifth Day — 6th Observation at 9 30 P M ,
Preparation 108 hours old 7 45 A M Slide, 1
Embryo visible*

After long watching the oral extremity is seen to move in a barely perceptible manner. No others nor traces of others to be seen.

Twelve hours afterwards both slides examined, and no traces of embryos could be observed on either. The examination of each slide took about 40 minutes, and it was closely inspected several times on each occasion.

EVENING SLIDES

*Fifth Day — 5th Observation at 9 30 P M ,
Preparation 96 hours old 9 30 P M Slide, 25
Embryos visible*

General languor marked, and motion more generally confined to extremities.

14th and 18th were very weak, and had to be watched for some time before motion other than in oral extremity could be detected.

*Sixth Day — 6th Observation at 9 30 P M ,
Preparation 120 hours old 9 30 P M Slide, 20
Embryos visible*

Twelve embryos much stretched out, undulatory motion running along body, pauses distinct.

13th to 16th much more vigorous.

17th and 18th quite dead, attenuated.

19th movement like the first embryo observed.

20th only two thirds of body present, very transparent. No traces of others visible.

*Seventh Day — 7th Observation at 9 30 P M ,
Preparation 144 hours old 9 30 P M Slide, 12
Embryos visible*

1st to 8th movement decidedly feeble and spasmodic.

9th to 12th quite dead, transparent, two thirds of another embryo was visible, it was much attenuated. No traces of others visible.

*Eighth Day — 8th Observation at 9 30 P M
Preparation 168 hours old 9 30 P M Slide, 4
Embryos visible*

1st very feeble motion of both extremities, central part of body passive.

2nd quite dead.

3rd very languid movement in lower extremity, which had to be watched for some time before it was detected.

4th quite dead. There were traces of two or three others, or what appeared to be portions of others.

An examination made 12 hours afterwards failed to detect any living embryos, and only one dead one was seen, with traces of two others. The slide was examined for about 40 minutes each day.

It will thus be seen that, 12 hours after extraction, out of the 12 embryos originally contained on the 7 45 A M slide, 4 had disappeared, and there was 1 dead embryo in the field. With the 8 A M slide, after 12 hours, 2 had disappeared, 24 hours after this—that is, 36 hours after withdrawal,—2 dead embryos were visible, but there was no diminution in the number on the 7 45 A M slide.

In 60 hours only 5 embryos, or rather $4\frac{1}{3}$, were to be seen on the 7 45 A M slide, making a total loss in the time of $7\frac{2}{3}$. The 8 A M slide does not appear to have been examined at this time, for I have no note of it, but in 84 hours only 2 embryos were visible on the 7 45 A M slide, 1 of which was quite dead, making a loss in this time of 10.

On the 8 A M slide there were also only 2 embryos visible, or rather $1\frac{2}{3}$, and in 108 hours but 1 embryo *in articulo mortis* was to be seen on the 7 45 A M slide.

With the evening slide I found that up to 24 hours the numbers remained undiminished and the condition satisfactory, though certainly less vigour was displayed than on the first observation, and it was not until 72 hours after withdrawal that the first embryo disappeared, and very decided signs of debility were present. In 96 hours languor became very marked, but still only 6 embryos had disappeared, and in 120 hours 11 had vanished, and the dead and dying were met with for the first time on the field. In 144 hours but 12 remained, and again dead embryos were to be seen. At the eighth observation—that is, 168 hours after withdrawal,—only 4 embryos were to be detected on the slide, 2 of which were quite dead and the others nearly so. 12 hours afterwards all had disappeared. In a word, the embryos withdrawn in the morning and treated in an exactly similar manner to those withdrawn in the evening were all more or less weak when first extracted, and had all died or disappeared two or three hours after the termination of the fourth day, whereas those withdrawn in the evening had not all disappeared or died until an hour or two past the seventh day, besides being very much more vigorous at the outset, and preserving their vivacity for a considerably longer period. It may be asked why, if the embryos die every 24 hours in the host, do they live so much longer when liberated? In reply to this I would suggest that up to a certain time the act of withdrawal is a compliance with the natural requirements of the parasite, and that whereas it is not impossible that continuance in the circulation of the host beyond the time allotted to them may set up influences designedly calculated to bring about a rapid fatality, and thus clear the way for the new swarm, on the other hand, some time might be necessary before the inadequacies of the artificial state made themselves felt, and thus, in lieu of sudden and general destruction, we have the gradual decadence of strength and vigour exhibited by the embryos preserved on the slides.

As to the cause of disappearance, I do not feel sufficiently informed to venture more than a surmise. I took every precaution to avoid missing embryos in my various searches, and I think the condition of the portions of embryos seen lends weight to the supposition that solution may be the final process by which removal is effected, at least, it would appear from what I saw that this was the most reasonable and probable method of accounting for what is no doubt a very remarkable and puzzling phenomenon. It may be (and on this account I am most anxious to speak with the greatest diffidence and caution) that all I observed is peculiar

to the solitary case on which I was able to experiment, and it may be found that with different subjects different results are obtained, this time and future investigation alone can determine

As some experiments I made by applying various matters to the blood, in order to observe the effect on the filariæ, may be of some interest apart from the immediate object for which they were undertaken, I will here describe them

To the preparation I added a drop of water, and from this the most speedy effects were visible. The blood corpuscles were washed away from the embryos, and the latter, absorbing the fluid, became dilated and enfeebled, and rapidly died. The great effort of the embryo seems to be to get in contact with the red corpuscles, and as soon as it becomes affected, this anxiety is more marked.

To another preparation I added a few fine crystals of arsenious acid. The embryos immediately began to stretch out, both they and the corpuscles becoming very transparent. The embryos moved in a feeble, jerky manner, and in 38 minutes the first death was noted. It was astonishing, however, what a comparatively large quantity of the drug it took to bring about this result.

To a third slide I added salicylic acid, when again extension and enfeeblement began immediately, and gradually increased until eight hours afterwards, when the first dead embryo was seen.

To a fourth drop I applied santonine, and although the embryos immediately began to extend their bodies and show symptoms of debility, the effect of this medicine was very much less marked than that of either arsenic or salicylic acid.

Quinine (I used the bisulphate on account of its solubility) had a rapid effect in reducing the embryos to the last stages of weakness, indeed, apparently a more speedy one in this respect than the arsenic, but I was not able to be sure of the death of an embryo until five or six hours had elapsed. When To AN was taking quinine (and so it was with the other two patients), I always noticed that the embryos were much less lively and healthy looking, and for this reason I was particular in seeing that he had taken none for some time before I made the observations set forth in Tables 2 and 3.

As the question is not, however, how to destroy the blood embryos, but rather how to get rid of their parental source, these therapeutical observations do not point to much that could not have been previously surmised, save that it seems likely that before an effective result could be obtained from the use of drugs, the blood would need to be so saturated that the remedies would probably act towards both host and parasite in a manner the impartiality of which would defeat the end desired.

It now seems tolerably certain that the *locale* of the mature worm is in the lymphatic system, and generally in the more superficial glands, so that the exact habits of the parasite, and the situations most frequently selected being first ascertained, it may be found that help lies more in the surgeon's knife than in the physician's medicaments, though, of course, with so indefinite a range, it is also highly probable that more than partial relief, in so far as the presence of embryos in the blood is concerned, cannot be very sanguinely anticipated.

With dogs, though worms are found in other parts of the vascular system, still the greater number abide in the heart, and undoubtedly from that position effect all their mischief. In man, the home of the parasite appears to be less desperately localised, and if it should happen that the favoured and most important lodging is one accessible from the surface, the human sufferer will not only have much of that despair alleviated, which observations on canine subjects might tend to justify, but may hope that those parasites which have taken up their abode in other and deeper situations may, like the extra-cardiac filariae in the dog, continue their existence without imperilling or materially inconveniencing that on which their own depends.

Alas! in China, where postmortems are so strictly prohibited, much progress in solving the remedial problem cannot be hoped for, but, perchance, clues obtained here from the living may lead to satisfactory results in lands where the pathologist is looked on with less horror and detestation than he excites in this country. I hope very shortly to recommence my experiments on monkeys with the genuine filaria-nurturing mosquito, and should success crown my efforts to infect them, doubtless much useful and interesting information may be obtained. I also hope at no distant date to be able to submit descriptions and measurements of the mosquitos found in this island, with a view of aiding in determining the peculiarities, if any, of those species which are to be dreaded, as compared with those which, as far as the diseases under notice are concerned, need not be regarded with such pathological interest.

CHART 2.

TEMPERATURES in MORNING, while EMBRYOS were disappearing from To Ad's Blood
(Hours at which Embryos disappeared marked thus +)

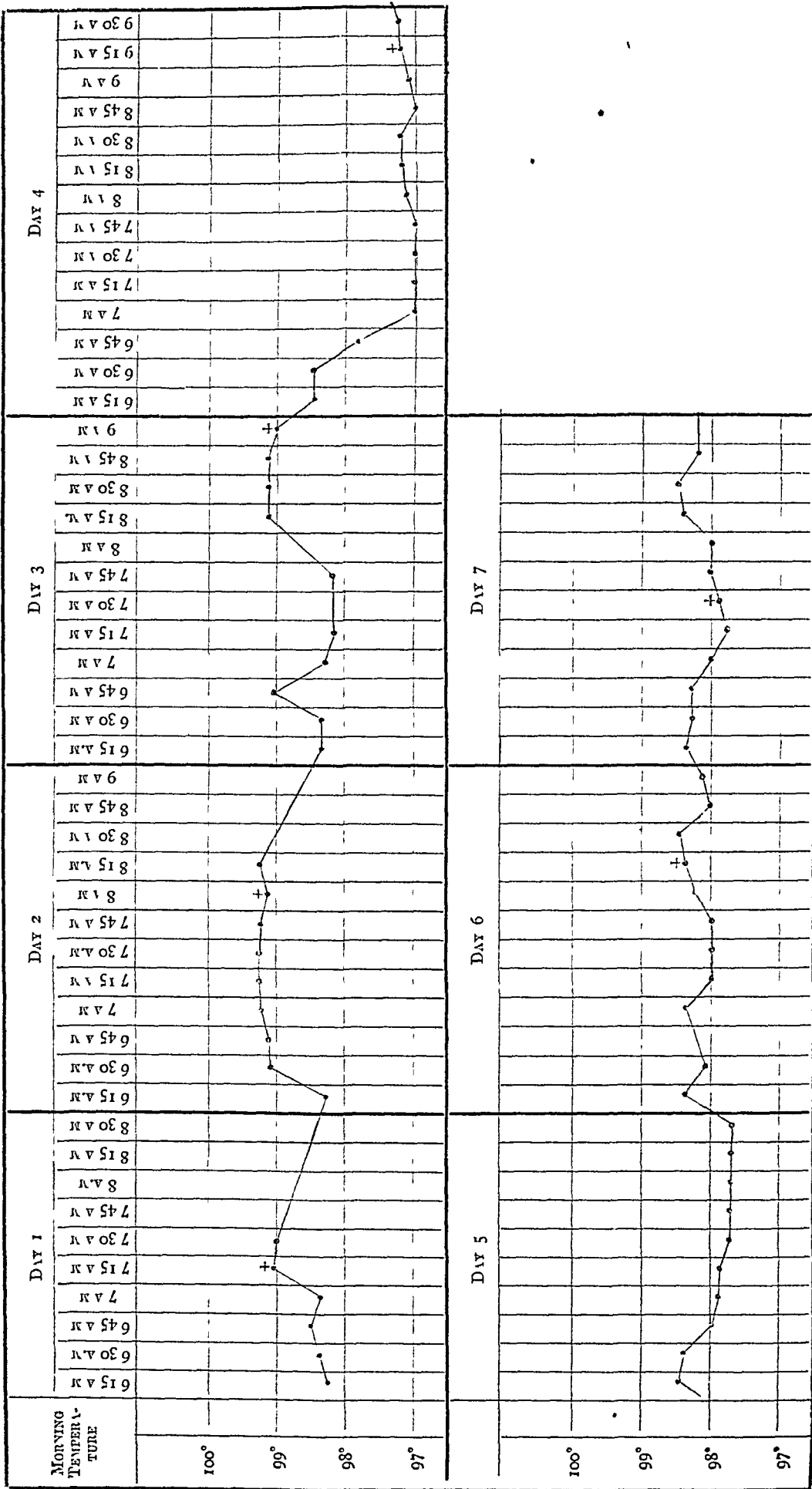
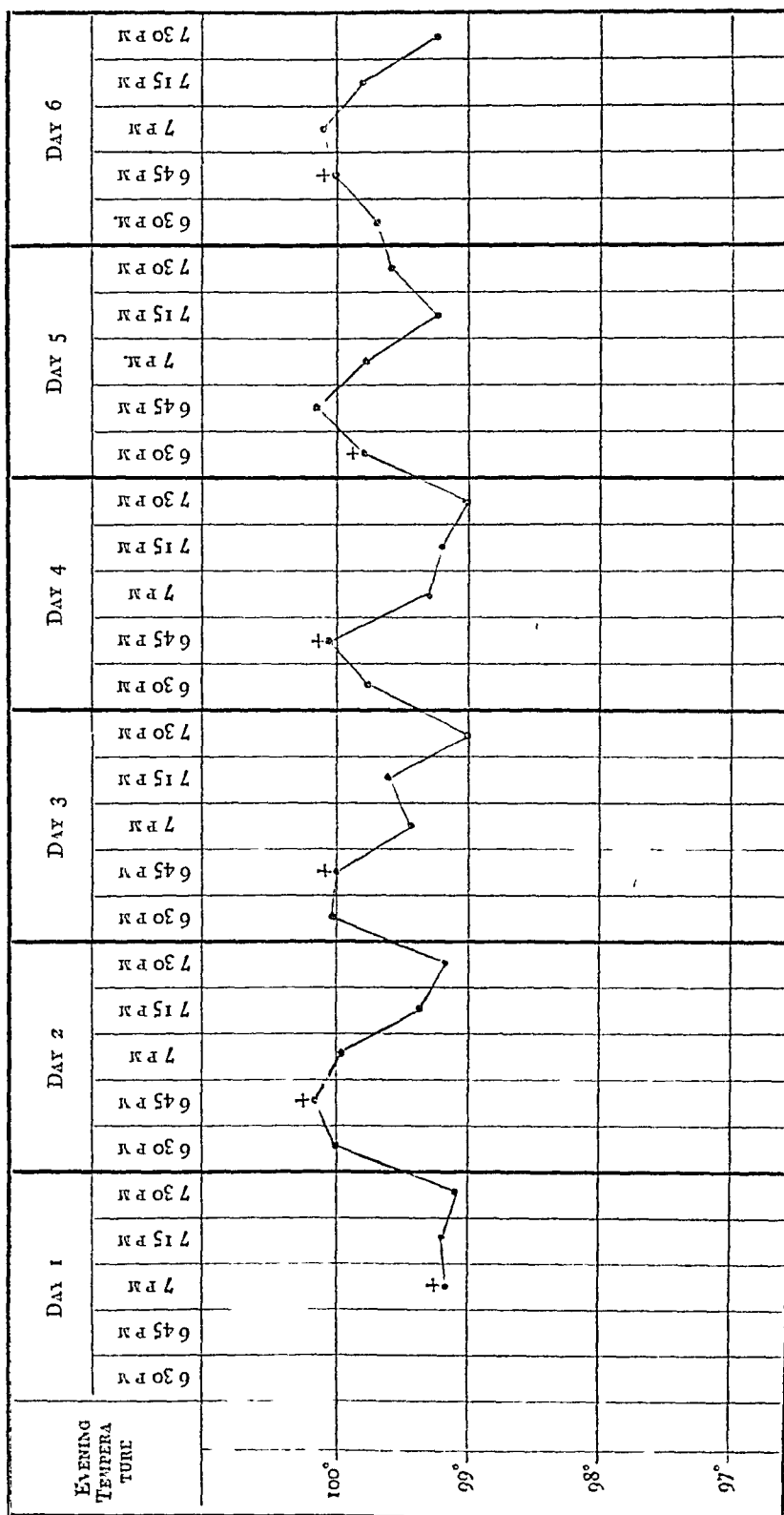


CHART 3.

TEMPERATURES IN EVENING, WHILE EMBRYOS WERE RETURNING TO TO AN'S BLOOD

(Hours at which Embryos reappear marked thus +)



TRICHINA SPIRALIS IN CHINESE PORK

By PATRICK MANSON, M D

IN his last Report Dr JAMIESON throws out a suggestion as to the nature of certain obscure cases he meets with among the Chinese. I recollect having seen the combination of fever, rheumatic pains in the muscles, and dropsy, but, until after reading his suggestion that the *Trichina spiralis* might be the cause of this peculiar combination of symptoms, did not seriously attempt an explanation—probably drew over it that cloak for ignorance we call “malaria,” and gave quinine.

The scavenger habits of the native pig must expose it to trichinosis and many other parasitic affections, provided the parasites exist in the country. I thought, therefore, it might prove interesting and useful to make a systematic examination, with the view of ascertaining if the pigs’ flesh exposed for sale in the native bazaar contained the trichina. A positive result would give us another reason, in addition to those supplied by the filthy habits and feeding of the animal, to proscribe native pork.

By procuring a certain number of specimens of pork daily for a considerable time, I managed to make a microscopic examination of a large number of carcasses. The examinations were by no means exhaustive, and I have little doubt that some instances of minor degrees of trichinosis were overlooked. 73 specimens were examined with a negative result, the 74th, however, proved to be extensively trichinosed, enormous numbers of encysted trichinae existing in every fragment of muscle. A second specimen of the disease was found in the 202nd carcass. The number examined was subsequently increased to 225, but no other example of the parasite was discovered.

These examinations are sufficient to establish the fact that *Trichina spiralis* is common enough in China, and that here, as elsewhere, the pig is liable to become its host. I have no doubt that the whole of the flesh of the animals in which I found the parasite was consumed as food, and I have little doubt that hundreds of pigs similarly diseased, not to mention rats and dogs, are eaten daily in every large Chinese town. Fortunately, pork as eaten by the native is always thoroughly cooked, and cooked in very small pieces, were it otherwise, we should long ere this have heard more of trichinosis in China. Cooked as the natives cook it there can be little danger, but a roast leg of pork cooked in foreign style would certainly be a most dangerous dish. Missionaries and others who travel much in the interior, away from the foreign bazaars, are, I have no doubt, often tempted to improve the meagre fare they have to live on by a dish of pork, but they should beware of the temptation, and if they will have pork, they ought to have it cooked in small pieces, thoroughly, and in native fashion.

NOTES ON SOME SKIN DISEASES

By PATRICK MANSON, M D

OWING to the diathetic influences of syphilis and leprosy, and to the fostering power of ignorance, a high temperature, and abundant dirt, skin diseases of the kind dependent on these causes are well represented in our native hospital. As is the case in most large seaports, syphilis is extremely common in Amoy. There are no regulations in force tending to check its spread, so that the notorious immorality of nearly all classes has brought it into almost every family. Leprosy, likewise, has laid a firm hold on the people, and I see a great amount of it. Amoy being a large town, pauper lepers are attracted to it as a promising place for begging, but this by no means explains the vast amount of leprosy passing through the hospital every year. I have made inquiry personally in many of the villages in the neighbourhood, and find that nearly every hamlet of a few hundred inhabitants has its leper or lepers. Systematic inquiry on this point, as far as it has gone, gives an average of one leper to every 450, or thereabouts, of the population.* Next to syphilis and leprosy, as causes of skin disease,

* When the time comes for sanitary science to have a place in the government of China, this problem of leprosy will be among the first to demand attention. It is a most unfortunate circumstance that Western medical science is not in a position to guide or advise—at least with confidence—on this subject. The important question of its communicability is not yet settled, except in an official way by the Royal College of Physicians. This official settlement is in the negative. But unofficial opinion seems now to be gradually veering towards a settlement in the affirmative, and indeed, in the face of certain well known facts in the history of the disease, it is difficult to understand how its communicability can be denied. I can only explain the denial by the absolute ignorance which prevails as to the steps of the process and the *vera causa* of the disease. In a recent number of the *Quarterly Journal of Microscopical Science*, HANSEN describes a bacterium he had found in leprosy, and two other Continental observers, EKLUND and NEISSER (*London Medical Record*, July 15, 1880), record some what similar observations. Three years ago, by cultivating the juices expressed from leper tubercles, I obtained in great profusion a bacterium resembling that figured in HANSEN'S paper. We should be rash to conclude that this bacterium had anything to do with the causation of leprosy, and observers who hurry to similar conclusions should pause. The present is the age of bacteria, and as they are searched for everywhere and in nearly every disease, they are found everywhere and in every disease. Concomitance and consequence are easily mixed up. Such a degenerate and half dead piece of flesh as is a leper tubercle is just the place wherein one would expect to find bacteria. Though one expects to find maggots in a dead body, yet we do not attribute the existence of the body or its death to the maggots, neither, when we find bacteria in the tubercles of a leper, should we, without other evidence than mere concomitance, attribute the tubercle and the leprosy to the bacterium. This bacillus lepre, as it has been christened, may, and probably will, turn out a mare's nest, like so many of its predecessors, but studies of the kind ought not to be discouraged. An hypothesis, though only a crude one, is an excellent stimulant to work, and, in trying to establish it, the path leading to the truth may be struck.

It is to be regretted that so little has been done towards the study of leprosy in China. For such a purpose China undoubtedly presents the largest field in the world. Perhaps it has been the least worked. This neglect is in great measure attributable to the short time that has elapsed since foreigners have had the chance to study the diseases of the country, and the impossibility of obtaining postmortem examinations, but principally to the fact that leprosy is studied only in hospital, rarely in its proper home, few medical men having the leisure or opportunity of following it there. Thus the subjective and objective symptoms of the disease have been abundantly described, and we have had "cases" *ad nauseam*, but genuine and vigorous efforts to study the disease in its home—such as those made by VANDYKE CARTER in India,—and to force from it there the history of its beginnings, and perhaps the secret of its cause, have been few indeed, and there seems little chance that any of us will have the requisite opportunity.

The action of the United States of America in this matter compares very favourably with the complete indifference of the Chinese Government, and the comparative indifference of the English Government. It has lately been brought

in the scale of frequency and importance, come the various skin parasites, animal and vegetable. With the exception of *diacunculus* and *microsporon* Audouini, I have found them all here, and very frequently two or more of them in the same individual. Once any of these lays hold of a native, it is likely to run its course uninterrupted by any treatment he may employ. As far as I know, the Chinese have no good parasitocides in general use.

Two skin diseases common in corresponding latitudes in some other parts of the world we miss. I have never recognised either *fiambœsia* or *anhum*. Pellagra, another skin disease associated with conditions such as are common enough here, I have not seen, and it appears to be unknown. Bad rice and cereals of different kinds are consumed in abundance, but I do not think that maize enters largely into the dietary of any considerable proportion of the population.

As regards other skin diseases, I have not remarked any very striking peculiarity distinguishing them from the same diseases as seen in Europe. Eczema, psoriasis, acne, lupus, and so on, are stock diseases here, as at home. The hypertrophic skin diseases, such as keloid and elephantiasis, are unusually common, but the accepted descriptions apply to them here as elsewhere.

From time to time we meet interesting cases or rare combinations, and in the following notes I have brought together some cases of skin disease which appear to me to possess some points of interest, either as regards diagnosis or treatment.

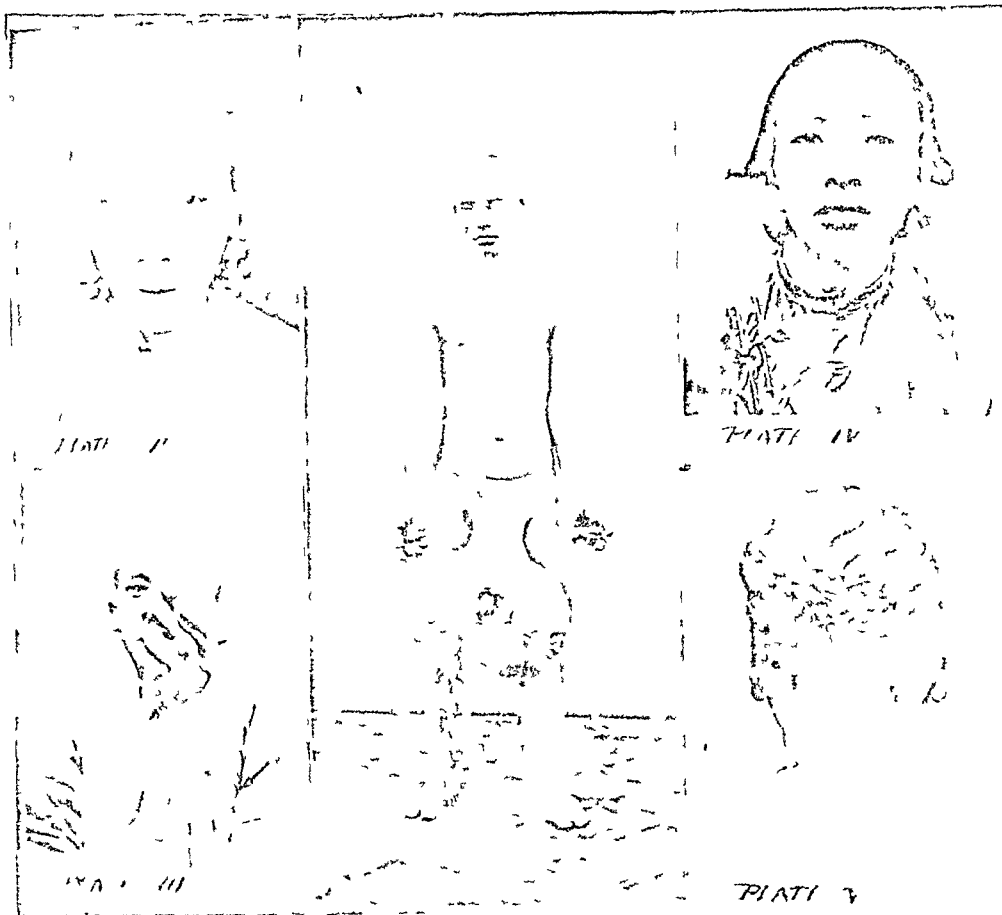
In a country where elephantiasis Asiaticum and elephantiasis Græcorum are common, occasionally both diseases will occur in the same individual. There is nothing remarkable about that. But when it comes to be a question of extensive surgical interference for the removal of an elephantiasis scroti in the person of a leper, the feasibility and wisdom of such an undertaking give an unusual interest to the combination of diseases. Such a case occurred in my practice lately, and as the outcome of the operation may encourage others who hesitate to interfere in similar cases, I give the particulars.

Leprosy and Elephantiasis Scroti, Operation, Recovery (Plate I) — SENG SEEN, male, æt 31, farm servant, native of Lamo, lately resident in Amoy.

His parents are both of them alive and in good health, as are also all his brothers and sisters. His grandfather's two younger brothers were lepers, one of them, still alive, has lost some of the fingers of his left hand, and has several leprous ulcers about him, the other died from leprous ulceration. SEEN's wife has elephantiasis of her left leg, she is otherwise well, but the two sons she had are both dead.

In a neighbouring village, about a quarter of a mile from his home in Lamo, are six lepers. With them, as well as with his leper relatives, the patient had frequent intercourse, working with them, eating with them, and often smoking their pipes.

To light that there are about 100 lepers in the United States. Immediately on the revelation of this fact the means of checking the spread of the disease became subject for discussion, and the thing is likely to become a Government matter. England has been familiar for centuries with the scourge, but, beyond calling for "reports" and establishing one or two leper asylums and other half measures, has done little. There are 100,000 lepers in British India. In China the number is certainly much in excess of this, and yet absolutely nothing is done either to alleviate the misery of the sufferers or to check the spread of the disease. The isolation and segregation of lepers as practised in China is a mere farce. Let us hope that the time is not far off when the Government of this country will recognise and do its duty towards its thousands of leper subjects.



Between his 14th and 19th years he had many attacks of scabies. When 21, had a fever he calls ague, he was laid up with it for about 20 days. The same sort of fever recurred the following year, accompanied by swelling of the right leg and scrotum and groin glands. He sent for a doctor, who cured the leg, but, in spite of treatment, the scrotum continued to enlarge steadily. At 25 the fever returned, and this time the left leg swelled as well as the scrotum. A similar attack occurred in his 27th year, and since then the swelling of the scrotum and left leg has made steady and rapid progress.

Symptoms of leprosy first showed themselves about the time of this last attack of fever, that is about four years ago. Then, spots, with itching periphery and anæsthetic centre, and about the size of a dollar, showed themselves on the left loin and shoulder. During his 28th year the thumb muscles of his left hand atrophied, and two years later the distal phalanges of the middle and index finger ulcerated, and later the little and ring fingers of the same hand became contracted. Leprous spots appeared on his cheeks and chin, and extensive surfaces on different parts of the body became anæsthetic.

Such, briefly, was his condition as regards his leprosy on admission to hospital. The disease was well marked and had made considerable progress. In addition to his sufferings from this cause, he dragged about with him a large elephantiasis of the scrotum, weighing many pounds, and reaching below his knees. His condition was a very wretched one, and the advanced state of his leprosy contra-indicated extensive surgical interference. But the discomfort arising from his tumour was such that he was eager to assume any risk to get rid of one at least of his miseries. As the neighbourhood of the neck of the tumour was not involved in any of the leprosy lesions, and his general health was not very bad, I assented to his request and removed the scrotum. After removal it weighed 31 pounds. From the faulty adjustment of the elastic ligature at the neck of the tumour, there was considerable and unnecessary hæmorrhage, but, notwithstanding this, he bore the operation well, and recovered without a bad symptom. He was walking about within a fortnight of the operation, and when he left hospital the wound was completely healed. Both testicles were free from hydrocele, and, along with the penis, were preserved, well covered by the flaps.

It has been asserted by some that the disease called "morphœa" is but a phase of leprosy. Now, if this were true, in countries where leprosy is abundant morphœa should also be common. This is so far from being the case that, though on the look-out for morphœa for many years, I have never seen a genuine example of this disease where I could be sure of the diagnosis. Pale, enucular, waxy-looking patches, devoid of hair and sweat glands, with a vascular border and slightly depressed and anæsthetic centre, I have often seen, but always in connexion with other and unquestionable evidence of leprosy. The only case I have seen which I incline to call genuine morphœa is the following, but even in this instance there are several points wanting to confirm such a diagnosis, and the history points to syphilis rather than to leprosy as the cause.

Leucodermatous Patches with Vascular Periphery, possibly Syphilitic (Plate II).—Tchenoo, female, æt 32, married, husband a coolie, formerly a soldier, lives in Amoy.

She has been married 11 years, and during that time has had three miscarriages, and three children at term. All the children died in childhood, of the miscarriages, one occurred six years ago, the second sixteen months, and the last—at the third month—four months ago.

Her general health is good. She says she has never had any venereal disease, but this assertion I doubt, for when her first miscarriage occurred she was suffering from palmar psoriasis, and in the hospital register of last year there is "syphilis" entered against her name.

The present eruption began about six months ago on her back and face. That on her back she says is better (though from its position it is difficult to know how she can tell), that on her face is spreading.

The eruption on the back is confined to three or four spots, about the size of small *cash*, arranged roughly in line over the spine in the hollow of the lumbar région. They are of the same character as those presently to be described, though coarser and less typical in their appearance.

Two large patches, one on either side of the middle line, occupy nearly the whole of the skin of the forehead. They are circular, pale patches, exactly like ordinary leucoderma, with the exception that their margins are red and slightly scurfy. The margin resembles very closely an ordinary ringworm, but contains no trichophyton. Like a ringworm, it itches at times. About the centre of both patches there are one or two irregular islands of normally pigmented skin. The whole of the diseased surface is normally sensitive, perspires naturally, and its hairs are still *in situ*. The ring is slightly but distinctly elevated, the included leucodermatous patch is neither elevated nor depressed. Besides these, there is a similar but smaller patch, circular, and the size of a half-dollar, on her right temple, two, the size of *cash*, symmetrically placed on the lower eyelids, and one or two smaller and irregular patches over right malar bone, left temple, and amongst the hair. In one or two places the vascular ring is incomplete, the leucoderma being continuous with the healthy skin.

She says the disease is gradually spreading, she is in good health, and I find no trace of any other active skin disease on the rest of her body.

Scleroderma is generally admitted to be allied to morphea. On the supposition that morphea is a form of leprosy, scleroderma should also be common here. I have seen but one case, however. The disease, though a very rare one, is so striking in its characters that it can hardly be overlooked. One can easily recognise it without any special experience in skin diseases.

The following are the particulars of the case I refer to —

Scleroderma following Fever — KHA, male, æt 34, farm servant, native of Autan, Tangoa.

With the exception of trifling attacks of fever in childhood, and slight dyspepsia when older, enjoyed fully good health, and was always a good worker, and constantly employed in the rice fields or at other farm work. Fourteen months ago, however, he was laid up with a severe fever, which, towards its conclusion, became a tertian ague. Altogether he was off work for about two months, and when he did get about again he felt excessively debilitated. By degrees his strength improved, and a year before he came to hospital he resumed his work. For about 10 days he felt moderately well. His work was in the wet paddy fields, and was fatiguing. The first intimation he had of anything wrong was a difficulty in bending his knees when stooping to work. This stiffness increased, and, after about a month, he observed that his ankles swelled towards the end of the day's work, the swelling subsiding by morning. This swelling continued for a month or two, and then ceased to recur, but by degrees the stiffness in the legs increased, gradually disqualifying him for work, and making him the helpless cripple he is at present.

He is quite unable to walk. His legs cannot be flexed at the knee beyond a right angle, nor extended to within 45° of the straight—that is, the play of the foot is restricted to an arc of 45°. He does not complain so much about his arms, though they are similarly affected, especially the right arm, the play of the elbow-joint being restricted to an angle of about 90°. The left arm can be extended nearly straight, but the wrists and hand-joints on both sides are almost incapable of movement. This state of affairs has come on gradually *pari passu* with and as the consequence of the extension of the peculiar condition of the skin I will attempt to describe.

The only parts where the skin can be described as normal are the head, neck, upper part of thorax as far down as the nipples, the back as low as the lower angle of the scapulæ, the upper arms as far as the insertion of the deltoid, the groins, and genitals, on the inner surface of the upper arms and elbows it is almost natural. The line of demarcation between sclerosed and sound skin is not very well defined, but may be traced as a broad band of slightly paler skin, shading off on both sides into healthy and diseased tissue. It is not elevated, nor are there any enlarged vessels or vascular streaks. The diseased

skin has a dry, shining, dusky, coppery look. It is impossible to say whether it is thickened, as it cannot be pinched up in a fold, so tightly is it stretched over the subjacent tissues. It looks exactly like kid or fine leather that has been thoroughly soaked, and then, after being tightly lashed to the limbs, allowed to dry. It is finely polished over the knees and some of the other joints, and gives one the impression that, if the limb were flexed, the skin would crack (not tear) transversely, or if it were cut, that the cut edges would spring apart as if a tightly-fitting glove had been incised. The polished legs and arms feel like sticks, so hard and hidebound are they. The hands, wrists and elbows are so gripped by the skin that the movements of pronation and supination have to be made at the shoulder-joint.

Beyond what he endures from inability to move, he suffers but little. At times he has a little itching in the knees and legs, but this hardly amounts to pain. His general health is excellent, and he has had no fever for over a year.

He says that sensation in the affected parts is normal, but declares they do not perspire. These are points I should have liked to investigate for myself, but as he left hospital after the second or third day, I had no opportunity. I ascertained, however, that his urine was free from albumen, that his digestion was good, and that his blood was normal.

Occasionally I meet with cases of chronic thickening and induration of the skin and subcutaneous tissue in different parts of the body. If this is found in the leg or some part where elephantiasis is usually developed, I consider it a limited variety of this disease. But when it is found in the head, or upper part of the body, or in situations where elephantiasis is unusual, and especially if the thickening is symmetrical, some cause other than that of elephantiasis must be at work. The following is an example of this disease —

Symmetrical Sclerema of Parotid Region — PONG, male, æt 17, Ankoe, a field worker.

Five or six years ago the integuments on the left side of the face began to swell and become indurated, two years later, those on the right side took on a similar action. He has had no pain, nor has there been any inflammation whatever. The left ear is rather deaf. He is quite well, and has always been so. None of the cervical glands are enlarged, nor, though rather thin, does he look sick.

Over a surface measuring about 3 inches by 2 covering the parotid glands and articulations of the jaw, the integuments are thickened, coarse and swollen. It is difficult to estimate the degree of thickening, but at the centre of the swelling on the left side, which is the one most affected, it may be about two thirds of an inch. There is no abrupt line of demarcation between the affected and healthy skin, but the former gradually shades off into the latter. At the centre of the swelling the skin is adherent to the subjacent tissues. The anterior part of the external ear and the external auditory canal are involved on both sides, and the pinnae in consequence are raised somewhat from the head. There is no discolouration, ulceration, pain or tenderness, only the very manifest swelling and slight coarseness of the surface mark the site of the disease. To the touch it feels like a soft form of elephantiasis.

Once I met with a somewhat similar case of limited and symmetrical hypertrophy of the integuments, but in this instance it was associated with the formation of numerous keloid growths on the skin of the chest, and also very marked exophthalmos. As all of these conditions developed simultaneously, or nearly so, there is reason to think they were all dependent on the same cause, whatever that may have been. The combination, at all events, is an interesting one, and is my reason for giving the following details —

Limited Sclerema of both Legs, Keloid Growths on Chest, Exophthalmos — KIA, male, æt 35, native of Biehing, Tangoa, a farm servant.

Both parents are dead, father at 81, mother at 50. Has four brothers and one sister, all of them alive and well. He himself until lately enjoyed good health.

Two years ago he emigrated to Tækoon, Annam, where for eight months he worked as a rice-pounder. subsequently he was employed as a flour merchant, and latterly as a cook, but his present illness unfitted him for further work, and about two months ago he returned to China.

Eighteen months ago a pustular eruption appeared on his chest. Some of the swellings burst and disappeared, others, again, did not proceed to suppuration, but remained hard and elevated, as they are at present. About the same time the affection of his legs commenced, without pain or any sign of inflammation, spreading gradually—the right first, and, about a month later, the left. His eyes have troubled him for about a year, they frequently inflame, sometimes they are worse, sometimes better.

He says he has never had syphilis.

The exophthalmos is very marked, yet he says vision is good. The left conjunctiva is inflamed, and the cornea is inclined to be cloudy. The right conjunctiva is also slightly inflamed, but beyond this slight degree of inflammation and the very marked protrusion of both eyes, they seem healthy. There is no throbbing of the carotids, enlargement of the thyroid gland, marked palpitation, or any of the other symptoms usually associated with Graves' disease, except perhaps the quickening of the pulse, which, when I examined him, beat 100 in the minute. There is an abundant crop of ordinary pityriasis versicolor on different parts of his body, and on the front of his chest about 20 small tubercles, varying in size from a No. 2 shot to swan shot. They are hard, red, and look like small keloids.

On the anterior aspect of the lower third of both legs is an irregular patch of thickened indurated tissue, irregular in outline, measuring about 4 inches by 2 inches. The patches are nearly symmetrical in shape as well as in position, and feel as if they were about $\frac{1}{2}$ inch to $\frac{2}{3}$ of an inch in thickness. The effusion appears to involve the subcutaneous tissue as well as the skin. The colour is slightly darker than the rest of the skin. Sensibility is normal, the hairs are still *in situ*, and the sudoriparous follicles act with those of the rest of the skin. From the slight depression and gaping of the hair follicles, the epidermis has a coarse, rough appearance. Altogether these two patches look like a cross between a large leprosy tubercle and a limited incipient elephantiasis. There is no enlargement of the groin glands, nor, beyond debility, any other disease.

Some years ago I met with a case of hypertrophic skin disease for which I have difficulty in finding a name. Inasmuch as there was hypertrophy of all the integuments, it bore some resemblance to the cases I have just described as sclerema, or to elephantiasis. But when carefully examined, the morbid tissues were felt to be softer than would justify the application to it of the term sclerema, and when subsequently cut into were found to be much too vascular for ordinary elephantiasis. From the latter affection the absence of intermitting lymphatic fever and inflammation tend, in addition, to separate it. I use the term dermatolysis to express the fact that the skin hung in loose folds. I regret that my notes of this case have been mislaid but its main features I recollect very well.

The man was about 35 years of age, enjoyed good health, and got his living by hawking trifles about the country. He came to hospital to see if I could do anything to improve his appearance. He was so abominably ugly that the village boys used to hoot at him, and pelt him, and otherwise persecute him with their usual ingenious cruelty. The mass of superfluous integument on his face had been many years growing, an idea of its dimensions and general appearance can best be got from Plate III*. Partly to support it, and partly to hide the hideous deformity, the poor man had acquired wonderful dexterity in adjusting his headcloth, and otherwise in concealing his face, but when the support was removed, the whole of the integuments of the left side fell down in massive folds, reaching nearly to his shoulder. The disease occupied all the left side of the face to the middle line, extended upwards on to the hairy scalp,

* As this was taken after the operation, it does not show the full extent of the original disease, as about one half of the tumour at its lower part was removed.

and backwards to the external ear, which it partly involved. A great fold covered completely the left eye, this organ, however, was quite sound. The nostril and mouth were dragged down enormously. The surface of the hypertrophied integuments was rather coarse, and had one or two warty protuberances on it. If a fold was pinched up between the fingers, the coarseness of the skin could easily be made out, and at the same time it was clear that the subcutaneous tissues were also involved in the general hypertrophy. Hair and hair follicles were coarse, but otherwise normal. In the hope of improving his appearance somewhat, I removed a considerable part of the redundant mass, but, on account of profuse bleeding from a large number of vessels, had to limit the extent of the incisions. He recovered from the operation very slowly, rather improved in appearance and more comfortable, but some years afterwards when I again saw him he was about as ugly as ever.

An artificial form of dermatolysis is very common here on the occiputs of old women. It is produced partly by the dragging of the heavy coiffure, and partly by the way in which the hair is lashed into the framework of this wonderful mystery. The whole scalp is thereby forcibly pulled backwards, and after a time, in many women, is so stretched that a redundant mass of wrinkled integuments accumulates in folds at the back of the head. I have often seen this dermatolysis so considerable that the whole repulsive-looking mass could be grasped in the hand and raised completely away from the cranium. When such a woman becomes bald she uses this piece of redundant integument as a foundation on which to glue or otherwise attach her false hair, thereby in the course of a very few years, still further increasing the deformity.

I refrain from attaching a name to the disease illustrated by the following case. From a superficial examination of the little tumours behind the ears, one would be apt to diagnose molluscum contagiosum, but a careful examination revealed the absence of several of the characteristic features of that disease, for example, the central depression and orifice, the tendency to become sessile when of any size, the expressible contents*. Those on the hands were very hard and apparently fibrous and solid, but those behind the ears gave the impression that, besides the dense fibrous capsule, there was a minute cavity in the centre containing a small quantity of serous fluid, this, and the fact that the disease succeeded the suppression of profuse and habitual sweating, lead me to regard it as an affection of the sudoriferous glands.

Symmetrical Development of Minute Tumours after Suppression of Profuse Sweating—IV, female, æt 35, a widow, lives at Tchenguahoe.

She came to hospital to be treated for dyspepsia and general debility, her tongue was coated with a yellow fur, she was constantly eructating gas, had very little appetite, and was evidently very ill.

Observing the peculiar skin disease on her hands and scalp which I will presently describe, I took some trouble to get at her antecedents, but she appeared to be so depressed, and was so reticent, that it was very difficult to get her to speak about her history. However, I ascertained that her husband died abroad about 10 years ago, and left her, with two children, to the care of a relative. She was very much attached to her children and guardian, and when three years ago they all died, one after another, she grieved excessively, lost her appetite completely, and gradually fell into the state of semi-dementia she is in at present. She says she has a tumour under the left false ribs, possibly an enlarged spleen, but declines to allow an examination. She cannot say when this began, but gives no history of fever. She states that about the time of her children's death she spat blood on two occasions, but only in very small quantity, has no cough now. She also states that since that time till within three or four months ago, her scalp

* According to my experience, molluscum contagiosum is not a common disease in this part of China. I have seen a few cases of it, however, both in foreigners and natives.

perspired very profusely, wetting her hair and pillow. This excessive secretion gradually diminished, and at the same time the tubercles on hands and head began to appear.

The eruption is confined to the hands, wrists, back of the ears, and neighbouring scalp.

Left hand. The tubercles are grouped on the back of the hand, especially over the metacarpophalangeal joints of the thumb, fore and middle fingers, and at the joints of the fingers, also at the wrist over the end of the ulna. The smaller tubercles are hemispherical, the larger somewhat flattened, varying in size from a No. 2 shot to bosses half an inch in diameter. They are hard, movable, and are evidently situated in the corium. The surface is smooth, and has the same colour in some instances as the rest of the skin, while in others it is slightly polished and has somewhat of a pale pink, waxy look. One tubercle, larger than the others, is distinctly cupped at the centre, and in its neighbourhood are several others, smaller, and with this condition less strongly marked, these are over the end of the ulna. There are no tubercles on the palm of the hand, nor on the inner surface of the arm, but if the finger is run over the skin, especially of the lower and dorsal part of the forearm and the back of the hand, irregular thickening, as if from effusion into the corium, can be felt, the eye can hardly detect it, however, the effusion is so small, and is unaccompanied by any discolouration.

Right hand and wrist similarly affected, though in a less degree.

None of these tubercles are deficient in sensation, though their appearance is somewhat suggestive of leprosy.

Behind both ears, but not implicating the pinnae, over the mastoid processes, and extending both upwards and backwards for 3 or 4 inches, more sparsely towards the circumference than on the mastoid region, are many small pearly-looking tubercles, in size ranging from No. 1 to B.B. shot, each nearly a perfect hemisphere, and springing abruptly from sound skin. Some are rather brown and discoloured, but the majority are perfectly clean and smooth, looking as if they were pearls that had been cut in two and glued to the skin. They are very firm to the touch and are normally sensitive. In the scalp one can see they have no connexion with the hair follicles, they are between the hairs, and no speck or depression can be found at the centre suggestive of an orifice or duct. A needle thrust into a tubercle meets with considerable resistance at first, but after it has penetrated a short distance, a feeling is conveyed to the finger as if the point had entered looser tissue or a small cavity filled with fluid, and, indeed, in some instances in which I had pricked the tubercle, a minute droplet of clear fluid appeared at the puncture on the withdrawal of the needle. They are not at all vascular, they bleed but little when pricked or when snipped off with a scissors. None of them are sessile or umbilicated.

The skin at the back of the neck is very dark and coarse, and feels thickened, and here and there are a few badly-defined tubercles. Towards the lower part of the nape, and where the skin is coarse and tends to lie in folds, the tubercles are for the most part arranged roughly in lines on the ridges following the normal flexures of the skin.

At the tip of tongue, and exactly in the middle line, is a smooth tubercle of the same shape and size as those behind the ears, it is pink on the surface, one or two flattened atrophied papillae shining through the epithelium.

She says there are no tubercles on her body or legs, but declines to allow me to look for myself.

I removed one or two of the post-auricular tumours and placed them under the microscope, but beyond ascertaining that they were principally made up of an interlacement of fibrous tissue, I could make out nothing of importance.

The liability of cicatricial tissue to assume a keloid character in the dark-skinned races is well known. The Chinese in this respect probably occupy a position intermediate between the black negro and the fair European. I have therefore frequent opportunities of seeing this disease, and some time ago met a case illustrating a feature not referred to by the usual authorities.

Cases like that represented in Plate IV are common, and I see from Dr DUDGEON'S *Peking Hospital Report for 1879* that he is familiar with them likewise. The lobules of the ears when pierced for ear-rings, owing probably to the subsequent constant irritation they are subjected to when healing, frequently become the seat of keloid growths, and I am often called on to remove such. In this particular woman the tumours were large—bigger than walnuts,—and from them symmetry produced rather a singular appearance.

Plate V is the photograph of a farm labourer, with two large symmetrically-arranged keloids on the hairy scalp, about $1\frac{1}{2}$ inch behind the pinnæ. He states that they began to grow after the healing of a pustular eruption, which, starting in the occipital region, spread laterally in the direction of the ears. The small ulcers healed perfectly, but from the scars of two of them the growths arose. Each tumour was about $1\frac{1}{2}$ inch in diameter and $\frac{3}{4}$ inch in thickness. They sprang abruptly from the sound tissues, and had all the usual characters of keloid, with the exception that they wanted the claw-like processes usually found running from the circumference of such tumours.

A tendency to symmetrical arrangement such as we see in these cases I have not found attributed to this disease. It might be said that the symmetrical disposition was artificially produced in the first instance, but such cannot be adduced to explain this peculiarity in the second, for though the pustular eruption—the exciting cause—occupied a considerable area of the scalp, yet it was only at two points symmetrically placed behind the ears that the cicatricial tissue took on this peculiar hypertrophy.

It would appear, therefore, that the skin on each half of the body has local peculiarities, which peculiarities are symmetrically disposed, and that when the appropriate exciting cause is symmetrically applied, symmetrical disease results, though when applied on other parts it may be innocuous. It is customary to regard symmetrical arrangement of skin disease as evidence of blood taint or constitutional affection, but one frequently sees in the case of epiphytic skin lesion, especially in pityriasis versicolor and in the disease I described some years ago under the name of tinea imbricata, an almost perfect symmetry of distribution. In these cases there can certainly be no question of constitutional disease, the explanation is that in such cases and in certain instances of keloid, the elements capable of supporting a fungus or taking on a keloid character are not universally distributed throughout the entire surface of the body, but irregularly as regards each side and symmetrically as regards opposite sides.

I lately saw an excellent example of that rare form of pityriasis versicolor known as pityriasis nigra. From the frequency with which the Chinese and foreigners in China are attacked with chloasma, one would think pityriasis nigra should not be a very rare occurrence, but I recollect seeing only one other case.

The man the subject of this note was a silversmith in Amoy, 24 years of age, and in the enjoyment of excellent general health. His skin disease had been in existence for about five years. It persisted throughout the year, the only difference the cold weather made on it was an increase of the scurfiness. The dark colour was unaffected by changes in the temperature or moistness of the atmosphere. When I saw him, the skin of the chest, neck, abdomen, back, arms and fore arms was all more or less involved, and in degree in the order in which I have enumerated the parts. The legs and face were not affected. On the chest and neck the patches were very large and ran into each other, elsewhere the disease was in small

circles varying in size from a pin's head to a *cash*. The colour of these patches varied from a dark brown almost to black, the colour being most intense towards and at the circumference. An ordinary chloasma would in this man have been paler than the healthy skin. I removed with a knife the epidermis from one of the smaller and darker patches, and, after moistening it with a little liquor potassæ, placed it under the microscope. When the epidermis was removed, the subjacent skin was seen to be of the usual natural colour, and it was evident, therefore, that the pigment matter was quite superficial, and not a deposit in the rete Malpighii. The result of the microscopical examination was to show enormous development of the ordinary microsporon furfur, the spores aggregated in grape-like bunches scattered over the intricate much segmented mycelium in the usual and characteristic patterns, but instead of the grape-like bunches of spores being a light fawn colour, they were very dark, and might be likened to bunches of dark-coloured grapes. The pigment appeared to be deposited in the wall of the double-outlined spores, more in the spores at the outside of the bunch than in those at the centre, and in certain bunches, where it was in great abundance, the little spores had a withered, shrivelled look, a sort of pigmentary degeneration. Surrounding many of the bunches, minute particles of pigment could be seen free of the fungus elements. In many places there were larger and coarser masses of dark brown matter, suggesting by their granular appearance that they were the withered remains of spore clusters. As a rule, the mycelium was plump and healthy looking, but occasionally two or three segments were to be seen more or less pigmented—some, indeed, being quite shrunken and black looking, like pieces of charcoal.

It is evident, therefore, that pityriasis nigra is the result of a disease, if I may so term it, of the ordinary microsporon furfur, and that it does not owe its characteristic appearance to any exaggeration of the natural pigment of the rete Malpighii, but to pigmentary degeneration of the fungus in the epidermis.

A —D1 JAMES WATSON'S Report on the Health of Newchwang for the Year
ended 31st March 1881

THE climate during the twelve months under review was somewhat drier, the spring was less boisterous, the autumn's advent earlier, and the winter was introduced by a more sudden and a severer degree of cold, than in some recent years. As a consequence of the little rainfall in summer, we had a good many days in which disagreeable duststorms occurred, but there was no appreciable increase of sickness during that season, which we sometimes have in such circumstances.

With the exception of one or two cases of severe diarrhoea in young children, the summer was as healthy to Chinese and foreigners alike as it was cool and pleasant.

The winter weather was not specially remarkable, except that two severe snowstorms occurred, with violent north-east winds. It was almost impossible to endure their violence, so fierce and blinding were the wind and snow. There had been no snowstorms in this district approaching them in force during the preceding 15 years. The meteorological table which I append to this Report gives with sufficient detail all that is necessary to furnish as to the climatic conditions which have obtained during the year.

While to foreigners and Chinese the summer was a salubrious season, the winter months were notably unhealthy so far as the former were concerned. There was the ordinary amount of sickness among the Chinese, but nothing more, while almost every foreign resident suffered, and in some cases severely. If there had been relatively as much sickness among the Chinese as there was among foreigners, I should have been tempted to assign as the cause the small rainfall during the summer and autumn. But this theory is not tenable, as the Chinese are crowded together, and depend upon rain as a means of clearing out their drains and carrying off their filth, while the European community live in large compounds and in comfortable houses far apart from each other, have no drains, and have all noxious matters removed from their vicinity at short intervals. Our circumstances as compared with the Chinese in a sanitary point of view are extremely good, and yet our little settlement had a much higher per-centage of sickness than the native town during the winter. This is exactly the opposite of what in the past has been our experience in summer or winter. During the cholera epidemic hundreds of Chinese died, while no foreign resident suffered from the disease. In the same way small-pox and other fevers have in the past been common among the Chinese, and unknown among the European community. This winter the tables were turned, and, from some cause which I cannot discover, we have had an epidemic of quinsy, and a considerable number of cases of measles, besides individual cases of scarlet fever and typhus. I shall in a sentence or two refer to each of these diseases.

Quinsy, although not generally a dangerous disease, is sufficiently disagreeable. In my experience of it last year it attacked nearly every foreign adult. In most instances the inflammation of the tonsils proceeded to suppuration, and in one case assumed malignant features. The majority of these patients had more than one attack. The largest number and severest cases occurred in the first half of the winter. After a considerable fall of snow the affection became less frequent and milder in character. As to treatment, I found the inhalation of steam, and gargles of hot water with laudanum, relieve the pain, and the application of the solid nitrate of silver and astringent gargles rapidly cured the ulceration.

Measles occurred in six European families, and there were in all 13 cases. Two or three of them were severe as regards the amount of fever and pulmonary congestion, while one was complicated by rheumatism in the wrists and ankles, but all made a perfect recovery. Of these 13 cases, two were adults, the others children between 1 month and 8 years of age.

Scarlet fever is not common in the north of China, but I have on former occasions reported one or two cases of it.

Last winter two children (sisters), aged respectively 2 and 4 years, had very sharp attacks. In each case the characteristic rash appeared within 24 hours of a somewhat severe vomiting fit, which in both instances was the first hint that there was anything wrong. In the elder of the two the fever ran high and there was considerable delirium at night. The throat was severely inflamed, as were also the cervical glands. Throughout the course of the disease the urine was regularly tested, and, with the exception of one or two days, there was merely a trace of albumen in it, on those two or three days, however, the amount of albumen was large. In the younger patient the fever was not so high, and there was no delirium, but about the eighth day of the sickness nervous symptoms manifested themselves in the shape of sudden and frequent twitches and starts while asleep, and great irritability when awake. These symptoms were explained by the discovery of an abscess in the inner ear, where the fever poison seems in this case to have spent its power. Throughout the course of the fever the urine was never collected, and I was not able to test it. Desquamation was very considerable, and many of the scales were as large as floum pieces. The weakness in both was marked, but the younger soonest gained her normal strength. Four months after convalescence the cervical glands in the case of the elder sister remained distinctly enlarged, although a nourishing diet, cod liver oil, and the syrup of iodide of iron had been prescribed and persevered in. The primary treatment was simple. A mild saline mixture was exhibited, a warm bath was taken every night, and the whole body rubbed over with beef fat.

The nurse while tending on these two children suffered from a severe attack of quinsy, and required to be confined to bed for several days. Not only were the tonsils acutely inflamed, but the ulcers which formed took on an unhealthy action, and eventually a malignant character. At first I suspected the case to be one of scarlet fever, although there was no eruption and I was assured the woman had twice in England suffered from scarlatina. Eventually, however, I convinced myself that the case was a severe one of quinsy. There was no desquamation, the urine was nearly normal, and although the weakness induced by the suffering and inability to eat for some days was considerable, the ultimate recovery was good, and more rapid than if it had been a case of scarlatina.

Typhus—There was but one case of this fever during the year, and, as in the past, it occurred in the French Roman Catholic Mission.

The patient, the sister superior, had a distinct rigor, and was at once put to bed, while I was sent for. I found her complaining of severe headache, and pains in the back and limbs. The characteristic weakness of typhus was early manifested. On the third day she fainted three times, and throughout the course

of the fever it was necessary to support her by the free use of wine and other stimulants. The eruption appeared on the evening of the fourth day. There was never a very high temperature observed, the pulse ranged between 115 and 130, and there was much mental confusion, but no delirium. The only points of interest about this case were the exaggerated weakness of the patient, and the many weeks that elapsed before she regained her usual health.

I have seen a good many cases of typhus and have carefully observed and noted its symptoms, but I have never seen alarming weakness so early induced in this affection as in the members of the French mission. It is difficult to suggest a sufficient reason for this. Both priests and sisters have a simple but sufficient diet, with a moderate allowance of wine, and they all seem satisfied with their work and mode of life. The monotony of their life is a serious depressing factor, and when this is added to the grave elements of the disease, it may be enough to account for the condition of absolute and almost immediate prostration which declares itself when they suffer from typhus. The sister whose case I have referred to, after a prolonged period of weakness, is now in perfect health.

Frostbite—In the beginning of winter a good many cases of frostbite occur in the crews of Siamese vessels. I do not think I have ever observed a Chinese or European sailor so affected. But the Siamese often suffer from frostbite before the temperature is at the freezing point, so sensitive are they to even moderate cold, and if Siamese vessels did not leave our port before the severe winter overtakes us, there is no doubt frostbite would be a frequent and serious affection of their crews.

A Siamese vessel, the *Kimyongtye*, left Newchwang on 27th October, and, encountering a strong south-west gale, sprang a leak. The captain attempted to reach the coast of Corea, intending to beach his vessel, but a calm occurred, and it sank some four miles from the coast, in about 36° north latitude. The crew, consisting of a Danish master, 10 Swatow Chinamen, and 16 Siamese, managed to reach the shore in a boat and a water trunk. The chief officer and a sailor were drowned. The Coreans treated the shipwrecked crew kindly and supplied them with food, and they were conducted on the backs of oxen, or carts drawn by oxen, to Chinese territory, and there handed over to the authorities of this province on the 30th December. On the 1st January they continued their journey, travelling from 3 o'clock in the morning until sundown, and in seven days reached Moukden, where they remained a week, during which time they were well treated, each person receiving \$5 and a sheep skin coat. On the 17th January they left Moukden, and on the following day they encountered what they described as a "fearful snowstorm," the first they had experienced in their travels. On the 20th one of the Siamese died from exhaustion, two days later the shipwrecked crew arrived in our settlement, and I was asked to see them. I found that the captain and several of the Siamese crew were slightly affected by frostbite, and that one of the latter, so long ago as the 8th January, had complained that he was unable to move, in consequence of both his feet having lost their vitality. In addition to the sailors, there were two Siamese women, and a child two years old, who arrived here without having suffered any evil consequences from their exposure. The 10 Chinamen were also quite well.

The man whose two feet were so seriously injured was the only one who suffered severely from the hardships they had all passed through. He was in a very depressed state. Both feet were apparently quite dead, but as I have seen some cases recover when vitality seemed entirely lost, I attempted by repeated friction with snow, persevered in for some days, to restore sensation to the parts, but without avail. Twelve days after I first saw him, a distinct line, separating the living from the dead tissues, appeared. It was, however, necessary to wait, not only for the living parts to regain their normal vitality,

but that the general health of the poor fellow might be improved, before amputation could be thought of. Under the influence of good food, his general health slowly and slightly amended, when I determined to remove both feet by amputation at the lower third of the leg. I performed the operation on the 7th March, and although my patient was in anything but good condition, both stumps did well. In each a considerable portion of the flaps united by the first intention.

Dislocation of the Shoulder, Reduction after Three Months—The dislocation in question, which was downwards, is sufficiently frequent, and in the present instance was caused, as it generally is, by a fall on the hands. My only reason for mentioning it here is that one seldom reads or hears of cases where reduction is effected so long after the accident as in this case.

The patient was a fine, strong Chinaman from Moukden, who came to me after having visited several native doctors, who had failed to reduce the dislocation. My belief is that he cannot have consulted them until a long time after the accident, as many Chinese doctors in this neighbourhood are skilful in the treatment of such accidents. I have on one or two occasions been sent for to see natives who have had falls and dislocations, but before my arrival on the scene, the mischief had been discovered and rectified. In the present instance it was necessary to put the patient very deeply under the influence of chloroform, but with my foot in his axilla, and the assistance of a Chinaman to pull with me, while another exerted counter extension, I was fortunate enough to reduce the dislocation. For a couple of days afterwards there was some pain in the neighbourhood of the joint, but when I saw him, about a week subsequently, his joint was not only free from pain, but it was nearly as useful as before the accident.

During the year such accidents as sprained ankle, partial rupture of muscle, fractured ribs, lacerated hands—the latter requiring minor operations,—etc, have occurred in my practice on shore or in the shipping in the harbour, but as none of them were of special interest, I merely name them to indicate the character of the routine work at this port.

One death occurred during the year. The deceased was a member of the Customs out-door staff. He came here from one of the river ports suffering from a number of ailments, the liver was diseased and an abscess in it opened into the bowel, the lungs were condensed, and the large bronchi secreted large quantities of purulent matter, but there were no pulmonary cavities, the tissues generally were atrophied, and the heart was weak, and anæmic murmurs in its neighbourhood were often very distinct. He died on the 1st March from general wasting or phthisis.

There were two European children born during the year.

Mr T J BALLARD, Harbour Master, has kindly assisted me in drawing up the meteorological table which I append to this Report.

METEOROLOGICAL TABLE for the Year ended 31st March 1881

YEAR AND MONTH	Highest Reading of Barometer (Aneroïd) for the Month	Lowest Reading of Barometer (Aneroïd) for the Month	No of Days Temperature fell below Zero	No of Days Temperature fell below 10°	No of Days Temperature fell below 20°	No of Days Temperature fell below 32°	No of Days Temperature fell below 42°	No of Days Temperature was above 65°	No of Days Temperature was above 70°	No of Days Temperature was above 75°	No of Days Temperature was above 80°	No of Days Temperature was above 85°	No of Days Rain fell for upwards of 2 Hours in the 24	No of Days Snow fell for upwards of 2 Hours in the 24	No of Days no Rain or Snow fell	No of Days Thunderstorms occurred	No of Local Duststorms	No of Days High Winds prevailed for a longer Period than 2 Hours in the 24
1880																		
April	30 50	29 67				4	21						3		25			1
May	30 19	29 61					2	22	12	2			2		27		5	2
June	30 25	29 74					2	30	30	23	5		1		27		6	
July	30 09	29 57						31	30	30	20		9		23	1		
August	30 14	29 45						29	31	27	20	4	3		27		1	
September	30 49	29 92						22	18	11	4		5		23			
October	30 74	29 74				8	17	6	2				1		27	1	4	2
November	30 80	29 66			6	25	30						2		27			2
December	30 80	30 20		15	31	30	31								27			
1881																		
January	30 68	29 92	9	24	30	31	31							1	27		1	1
February	30 75	30 01	4	20	28	28	28							2	18		1	2
March	30 94	30 04	3	7	13	21	28							3	25			1

REMARKS.—The highest temperature registered was 91°, on the 4th August. The lowest temperature registered was -9°, on 18th January. Two severe gales occurred. One, on 24th October, commenced at 4 30 P.M., force 10 up to 9 P.M., and 8 up to 9 A.M. on the 25th instant, commenced as N.W., and changed to N.E. The other gale occurred on November 24th, it commenced at 8 30 P.M., force up to midnight, 10, from midnight up to 3 P.M. on the 25th instant, force 9, the gale was from the N.E.

The river was still crowded with floating ice on the 31st March, and the one or two vessels in harbour were exposed to considerable danger from the large masses that passed up and down with the tide.

B—D^r J G BRERETON'S Report on the Health of Chefoo for the Year
ended 31st March 1881

ABSTRACT of METEOROLOGICAL OBSERVATIONS

YEAR AND MONTH	THERMOMETER			No of Days over 90°	No of Days Snow	No of Days Rain
	Average	Maximum	Minimum			
1880	°	°	°			
April	57	85	29			12
May	68	94	42	1		7
June	72	89	54			5
July	77	94	60	3		6
August	80	99	62	3		5
September	72	93	50	1		7
October	57	85	30			1
November	44	66	22		2	4
December	30	47	13		7	
1881						
January	30	47	12		9	
February	32	52	12		6	3
March	41	74	18		5	

For the above table I am indebted to M^r JENNINGS, Harbour Master. I regret to say it is necessarily very imperfect, owing to the absence of proper meteorological instruments, and gives a very inadequate idea of climatic changes at this port. It will, however, be seen that during the summer of 1880 we had rather a high thermometer, but the heat was moderated considerably by refreshing sea breezes, so that we had even a cooler season than usual. The invigorating effect of this place was well exemplified in a few cases (visitors) during the summer, patients worn out through malarious diseases soon recovering their strength, and able to return to their homes in improved health after a sojourn here of two or three weeks. A shorter residence than this can scarcely be expected to produce permanent beneficial results, and the cases which are most benefited are those of protracted convalescence after any acute disease, or where malarial affections have induced considerable prostration without much organic change in spleen or liver.

The past winter, although prolonged, was not accompanied with the same degree of frost as during previous winters. Storms were, however, more frequent.

Throughout the year the health of the foreign community and natives in the surrounding districts was remarkably good. Serious affections among foreigners were comparatively rare, and none traceable to climatic influence.

Two cases only of lithæmia were met with, these were in individuals who indulged too freely in meat. Both quickly yielded to a change of diet.

Two peculiar cases occurred during the winter, in children, aged respectively 5 and 8.

During the day there would be no operation from the bowels, but when asleep for a couple of hours at night, they would be awakened by colicky pain in stomach, accompanied by an urgent desire to relieve the bowels. So urgent was the call, time was not afforded for them to be taken up, and the bowels were discharged in the bed as they lay, this took place three or four times during the night. During the daytime they would be perfectly well, in good spirits, with good appetite, no pain or tenderness in abdomen, and, as before remarked, no call upon the bowels. There was no evidence of worms. Dieting, no food for some hours before bedtime, and medicines completely failed to arrest it. The affection continued for about six weeks, then got better. The medicinal treatment pursued was occasional purgatives, sedatives, tonics and astringents, but all without any appreciable effect.

I have to record five confinements and four deaths during the 12 months.

Of the confinements, four were natural, and progressed satisfactorily, one was a case of twins.

In this instance the uterus was so distended as to be unable to make any expulsive efforts. Examination revealed a breech presentation, maternal parts were quite relaxed and prepared for delivery, but fearing there might be twins, and to avoid complicating the case, refrained from giving ergot, and effected delivery by turning. In both children the breech presented, male and female, one placenta. This case did not present an untoward symptom.

The cause of death in the four instances alluded to was—

- 1, exhaustion
- 2, cerebral meningitis
- 1, acquired phthisis

In both cases of meningitis the disease was ushered in by diarrhœa, the stools being green and slimy, and accompanied by considerable straining. Textbooks on the subject of meningitis generally state that constipation is the usual condition in this disease, but my experience does not quite coincide with this. I have far more frequently found relaxation of the bowels, generally slimy in character, to accompany this affection than constipation. Both these cases occurred in weakly children, aged about 9 or 10 months, the time when dentition would be in an active condition, but whether the dentition was the starting point of both relaxation of the bowels and brain affection, or the former was the precursor of the latter, is uncertain. Mercury was given in both instances, but without benefit.

The cases of death comprise two residents and two visitors.

C—Dr C Begg's Report on the Health of Hankow for the Half-year
ended 31st March 1881

I AM indebted to Mr Harbour Master LOVATT for the use of the meteorological tables, and from them I have drawn up the following abstract The observations have been taken at 9 A.M. and 3 P.M.

YEAR AND MONTH	WINDS												BAROMETER				THERMOMETER						HYGROMETER					
	Direction									Character							Maximum					Min	Mean for Month					
	No of Days Calm	No of Days N	No of Days S	No of Days E	No of Days W	No of Days N E	No of Days N W	No of Days S E	No of Days S W	No of Days Light Breeze	No of Days Fresh Breeze	No of Days Strong	9 A M		3 P M		9 A M			3 P M			Lowest Reading during Month	Wet		Dry		
													Highest	Lowest	Highest	Lowest	Highest	Lowest	Mean	Highest	Lowest	Mean						
1880													Inch	Inch	Inch	Inch	°	°	°	°	°	°	°	°	°	°	°	°
October	1	5	4	13	1	5		2		28	1	1	30.50	30.25	30.45	30.25	77	63	74	81	68	77	58	63	65	77	75	
November	1	8	3	12	2	2	1	1		19	8	2	30.70	30.35	30.65	30.30	68	35	59	75	37	60	31	49	52	54	60	
December		9		15		2	3	2		23	7	1	30.80	30.40	30.85	30.40	52	25	39	58	30	44	21	34	44	39	43	
1881																												
January		1	4	17		5	1	1	2	26	5		30.60	30.25	30.60	30.00	50	34	42	60	40	50	29	40	46	41	55	
February		7	7	11		3				22	5	1	30.60	30.00	30.55	29.95	61	36	43	69	37	52	33	41	44	43	47	
March		9	5	11	4	1	1			26	3	2	30.65	30.25	30.60	30.20	63	29	44	70	30	49	24	42	44	43	48	

The health of the foreign community in Hankow, in spite of the unhealthy situation of the concession, will compare favourably with that of any port in China.

I do not know at whose door to lay the blame, but certainly neither sanitary nor commercial authorities could have been consulted in the selection of the best site for the concession. The site chosen is a flat just below the Chinese towns and the entrance of the Han River into the Yangtze. Along the Bund, for the greater part of the year, the water—discoloured and saturated with impurities derived from the thousands who live either on it or on its banks just above—is either stagnant or flows in the opposite direction to the main stream, and yet this forms the only source of supply for the community, who fondly trust to alum for precipitation and protection. The ground had formerly been used as a burying ground, or at least part of it (one old resident tells me of removing 40 coffins from as many square superficial feet), and the yearly floods claimed it for their own.

The site that might have been chosen is a hill with a rocky base, extending to the edge of the river, above the Chinese cities and the Han, free from danger of floods, and, as far as possible, from malaria.

Once chosen, steps have been and still are being taken to raise the whole concession above the usual flood level. To raise it, however, with the important exception in some cases of the ground *underneath* the houses, converting it thus into a very good fever-trap. But not content with thus obtaining a perfect surface drainage, they introduced that which is dangerous at its best and deadly at its worst, namely, a system of drainage. A system made up of drains without a fall, or, what comes to the same thing, 3 feet of a fall divided over the system, drains whose outlet for many months of each year is far below the level of the surrounding water, drains made of porous bricks, specially adapted to adhere to anything which otherwise might have passed them, drains without ventilation, except for the communications with houses and streets, and these communications innocent of all attempts at trapping, in short, drains without surface, fall, ventilation, or traps, things generally held to be essential to any drainage system. To-day they are held to be safe, because the communications with the majority of the houses are blocked with *débris*, and attempts have been made in an impossible way to trap street openings and to prevent animal matter from obtaining entrance into the "system," attempts which are and must be failures, and which, could they succeed, would only convert the system into one *intended* to carry off surface water, which could be done better and safer from the surface of a raised settlement.

Such a state of things justifies me in saying that the site has been a sanitary mistake, while the rebuilding of falling godowns and the distorted and cracked walls of all the houses, the yearly damage to shipping from the "chowchow" water, caused by the entrance of the Han, are a convincing, though late, proof that the ships would be safer in the main current, above the disturbing influence, and the houses more lasting built on a rocky foundation.

Remittent and intermittent fever have been common during the past season, but only two cases of any severity, dysentery and dysenteric diarrhoea, a few cases, with one death, two sporadic cases of cholera, one fatal in a few hours, a good many cases of simple diarrhoea amongst children, and about 15 cases, in Chinese patients, of fever, which, in all symptoms except those of rash and motions, ran the typical course of typhoid—two fatally. Such, and the usual run of cases common to any people and country, has been my practice during the past 12 months.

On the 1st May 1880 I opened a small hospital for Chinese, built for me by the Roman Catholic Mission. One male ward, with room for 10 or 12 beds, and one female ward of same size, a waiting-room, with a small consulting-room, and a room used both as a dispensary and an operating-room, complete the building at present. My plan is to keep the in-door department, as a rule, for surgical cases and acute medical ones, all else are treated as out-door cases. Every day shows me more and more clearly how difficult it is to treat medical cases among Chinamen even in a hospital. Their homes, mode of life, diet, dirt, ignorance and prejudice are all arrayed against us. I have been forced to give up giving more than one day's medicine at a time, simply because I find that only the most intelligent Chinamen can be trusted to confine themselves to the amount prescribed. If a little does me good, more will do me more good, is then logic—a logic which has led in some cases to merely amusing, but in others to alarming, results. I am training three boys, and one of the Italian sisters devotes herself to the work, and our rule is that, if possible, the patient attends daily or gives proof

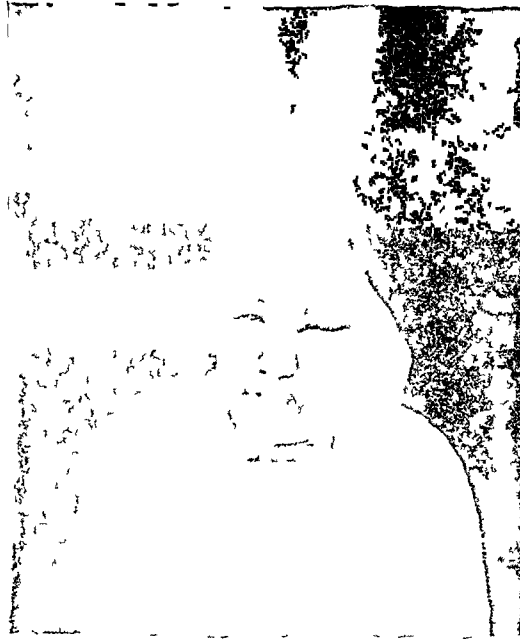
that he can be trusted. Of course, this is a great trouble, and tends to reduce the out-patient attendance list, but I hold that it is better in the long run to show a few that we do possess medicines which will do what we say we can do for them than to risk the reputation of "foreign" medicine by placing it in their power to experiment in the important matter of dosage. On the same principle I always tell an incurable that I cannot help him, or another that I can only relieve him.

During the 11 months I have had 2,834 out-door patients, of whom I should say 50 per cent only came once, and then were lost sight of, the relation between male and female patients being 20 per cent of the latter to 80 per cent of the former. The kinds of disease to which they are most subject bring out one fact very strongly, namely, that if we could correct their dirt and their diet, we would be able to reduce the number of cases of disease by at least 70 or 80 per cent, then dirt causing parasitic skin diseases, syphilis, ophthalmia, etc., to run riot among them, then diet distending their stomachs twice a day with large quantities of rice, etc., leading to permanent dilatation, with thinning of walls, hence hæmatemesis and disorder of secretion, causing the various forms of dyspepsia, with their long train of secondary evils, this state of things not only causing, but also complicating, all other diseases.

In-door cases number 158. Among a large number of operations successfully performed were one amputation at the shoulder-joint, one of the thigh, two of the leg, and one at the ankle-joint, excision of one-half of lower jaw, stretching of sciatic nerve, and removal of several tumours from various regions.

The ulcers taken in were all hopeless cases, unless treated in hospital or had features of special interest. Many were only admitted in the belief that they would prove cases of amputation. Skin-grafting proved very successful in many cases, and once, while excising a large portion of eyelid in a severe case of entropion, the idea occurred to me to try the excised portion on a healthy ulcer I then had in the ward. The result surprised and delighted me. The piece of skin, 1 inch long by $\frac{1}{2}$ inch broad, took, the cuticle merely coming off like a white film, the raised patch remaining red and healthy, sending out young epithelium in all directions, and completing the cure.

Mixed Fibro cystic and Scirrhus Tumour of Parotid Region—The photograph on the opposite page will show the stage at which a Chinaman applies for relief where there is an idea on the part of the patient that a knife will be required. The tumour had been growing for eight years. At first it was painless, latterly he had had intense pain day and night. He insisted on the operation, though the risk was impressed on him. The mass consisted of two portions: the larger, round, slightly movable on the deeper structures, at parts having a semi-fluctuating feeling, skin tense, pale, and non-adherent, round this mass at its upper, lower, and posterior parts was what felt and proved to be a dense infiltration of the tissues, with skin red and adherent. The operation lasted an hour and a half, and the patient lost a good deal of blood. I had the advantage of the able assistance of Dr DUDLEY, H B M S *Mosquito*. One long incision made from in front of the ear down on to the clavicle, and another at right angles, gave me plenty of room to remove the larger mass. The other part of the tumour gave the most trouble. It was attached to the transverse processes of the upper cervical vertebrae, and, infiltrating all the tissues, passed deeply into attachments at the base of the skull. It was impossible to cut wide, or to make sure of removing the whole of the disease. With care it was freed from its attachments, and the mass and all the diseased parts dissected out. The large wound was washed out with a strong solution of chloride of zinc. The operation gave



FRONT VIEW



BACK VIEW

entire relief from pain, and the wound healed without one bad symptom, except the sloughing of a part of one of the flaps. At the end of a month he left the hospital for his home, returning to show himself at the end of another month, and then there was evidence that the disease had not been completely eradicated, however, he returned to the country, and since then I have lost sight of him.

We had two deaths, one from ascites, one after tracheotomy.

During last summer I removed a fatty tumour the size of a child's head from the back of the wife of one of the mandarins here. The tumour had begun to ulcerate its way out before she would consent to operation. I operated at her own house, and had a large native audience.

An old hospital boy trained by my partner, Dr REID, has started in practice. Ten mandarins have given him £100 each per annum to support a hospital for poor Chinese in the heart of the city. He has adapted three Chinese houses, and thus made a beginning. A small charge (14 *cash*) is made when the patient comes for the first time, and other small charges are made for medicines. I obtain his drugs for him from home. He has asked me to promise to do his operations for him, but during my recent holiday he removed with success a fatty tumour weighing 2½ pounds from the shoulder of a mandarin's servant.

There is one form of disease seen here with which I have not met in England. I have called it in the hospital books a tubercular syphilide, for want of a better name. It seems to be a low form of inflammation in the cellular tissue, giving rise to subcutaneous "cold" abscesses of small size, but multiple. Its natural course is to discharge by one or more openings, and then to cicatrise, leaving a sensitive cicatrix. Sometimes the matter burrows for long distances under the skin, and often involves a large tract. The result of the contraction of these cicatrices is often great deformity, and often immobility of joints, when, as is often the case, the disease is in their vicinity. The contents of some, especially when situated near the anus, are of more consistency, and even in some cases cheesy in character.

In all cases I cannot obtain a history of syphilis, but all yield to iodide of potash and painting with iodine, and free incisions, dressing with strong carbolic oil. The most common situations are anus, shoulder, knee, on the thorax and neck. The patients are generally young adults, and, as a rule, are in robust health otherwise.

*D —Dr J JARDINE'S Report on the Health of Kiukiang for the Year
ended 31st March 1881*

DURING the period under review the health of this community has been fairly good. In the early part of last summer there was little sickness, and the weather was exceedingly temperate throughout the whole season. In the autumn, however, sickness in the form of malarial fevers was very common, a large proportion of the community suffering from remittent or intermittent fever of an unusually severe and obstinate type. Some cases, even of the intermittent form, quinine in doses of grs xx to grs xxx only alleviated somewhat, but failed to cure. It was specially remarked that those suffered most severely who were in the habit of bathing in the evenings in the lakes after the water began to subside over the flooded districts, and the special obstinacy of some of the cases to treatment was probably due to this cause. In spite of changes of air and other appropriate treatment, the fever persisted in several cases till the winter months, and one patient has only recovered from an increased evening temperature recently.

During the winter months catarrhs have been frequent, and one case of acute pneumonia of over 14 days' duration made an excellent recovery.

A larger number than usual of missionaries resident in the interior came here during the year for medical assistance, suffering from fever or dysentery, and they reported that sickness was unusually prevalent among the natives in the districts to which they belonged, as was likewise the case in Kiukiang and its neighbourhood. It has been often remarked that unusually mild summers here have been accompanied or followed by an increase in sickness, and the experience of last summer and autumn, so far as this point is concerned, seems to confirm this statement.

During last spring and summer the Catholic Mission of Kiukiang, assisted by natives and foreigners, founded a small hospital here, which was opened for the reception of patients in the beginning of July last. On the 31st December it was found that 1,420 natives had applied for and received medical aid.

Here, too, malarial fevers far exceeded in numbers any other disease, besides which a large number were treated for their sequelæ—chronic hypertrophy of the spleen, anæmia, and dropsy.

Cutaneous diseases, which ranked next in numbers, are due in no small measure to the filthy habits and indigent circumstances of the people, conjoined with their utter neglect of all sanitary measures.

Eye diseases, so common in every part of this Empire, here formed no exception to this rule, and ranked next in point of numbers, and it was in this department that probably the most gratifying results were obtained. Many applied for relief, suffering from entropion, cataract, and granular lids, who were either in total darkness or nearly so. In a large majority of cases

they have regained excellent sight, and all have been so improved as to be able to pursue their usual occupations.

Dysentery, acute and chronic, was very prevalent during the autumn. Acute dysentery had generally become subacute or chronic before the patients applied at the hospital, so that the chronic form had generally to be dealt with. As everyone knows, these are the difficult cases to influence speedily by drugs, and with the Chinese a change of air or sea voyage is beside the question. In these cases I was induced to try koroniko, from the *Veronica parviflora*, which is largely used in New Zealand as a remedy in dysentery and diarrhoea, and some of the results exceeded my most sanguine expectations. Many who received the drug did not return to report themselves, but I have notes of three cases of chronic dysentery, varying in duration from six weeks to four years, and voiding from 20 to 30 motions containing blood and mucus daily. Fifteen doses of tincture of koroniko reduced them to one-half, other 15 doses reduced them to three or four daily, and a third like quantity effected a complete cure. Judging from the few cases I have been able to follow, I augur a brilliant future for this remedy in the chronic forms of the disease.

Among the 1,420 patients, only three cases of leprosy were met with, none of which belonged to or were resident in Kiukiang, and as the natives here are a fish-eating population, the hypothesis that fish (putrid) plays any important part in the production of leprosy must, I think, be untenable.

Among the surgical cases, 86 operations were performed during the six months, and a number of opium-smokers were admitted and cured of their pernicious habit. One case of opium-poisoning made a successful recovery, the patient was a lad of 12 years, and took the opium by mistake.

In fine, no deaths have occurred among patients admitted into the hospital, and it is gratifying to learn that the institution has been so much appreciated by the natives that they have already contributed so generously as to liquidate the sum of $\text{£}1,100$ required to build the premises.

Ist E—D^r T RENNIE'S Report on the Health of Foochow for the Year
ended 31st March 1881

PREVIOUS to reporting on the health of Foochow during the past year, and in order to avoid repetition in subsequent Reports, it seems desirable to give some idea of the physical characters of the surrounding country and of the hygienic conditions under which its residents live.

The foreign settlement, distant 25 miles from the mouth of the river at Sharp Peak, is planted on a piece of hilly ground on the right bank of the north branch of the Min. About 7 miles above the settlement, the river, as it emerges from lofty mountainous banks, divides into two branches. The two streams, after pursuing separate courses for 15 miles—the northern, and larger, flowing past the settlement, and the southern being in its course largely augmented by the waters of the tributary branch of Yungfu—unite a little above Pagoda Anchorage. The island of Nantai, thus formed, on the northern side of which the settlement stands, is about 15 miles long, and varies in breadth from 2 to 6 miles. It occupies the centre and forms the greater portion of a large circular tract of low-lying cultivated land, enclosed on all sides by mountain ranges, varying from 1,000 to 3,000 feet in height. Scattered over this plain, sometimes called the "Valley of the Min," and occupying one-seventh of its extent, are several hills and ridges which run parallel with the course of the river. The remaining portion consists of low-lying, richly manured, alluvial land, with clay subsoil. Raised only 6 or 7 feet above the level of the river at high water, intersected by numerous tidal canals and creeks, and by means of artificial irrigation, the soil is during the greater part of the year submerged. On the river the tide extends quite to the top of the island of Nantai. During the rainy season the Min usually overflows its banks, and the view presented from any of the surrounding heights—*eg*, Kushan—is that of a large lake, from which ridges and hills rise like so many islands. During eight months of the year the plain, richly manured with nightsoil, is almost entirely devoted to the cultivation of two crops of rice. On some parts, during the cold months a crop of barley, wheat, or beans is raised, while the remainder, in a more or less swampy condition, is allowed to rest.

The hills, formed of granitic rock and decayed granite, are occupied, especially in the vicinity of the city and suburbs, by the tombs of natives. There are few spots on which scrub, coarse grass, and *Pinus Sinensis* do not grow, and around the bases of the hills, vegetable gardens and varieties of fruit trees—notably, peach, orange, lychee, plum, olives, etc.—abound.

The hill on which the foreign settlement stands, whose highest point is about 100 feet above the level of the plain, is skirted on one side by the river, elsewhere, save on its western aspect, where a neck of slightly rising ground connects it with a range of hills some 3 miles in extent, the hill is bounded by rice fields.

Three miles to the north of the foreign settlement, which is situated about the centre of the plain, on the north side of the river, the city of Foochow, the capital of the province of Fukien, stands, in latitude 26° 5' N, and longitude 119° 20' E. The city, with a population of 500,000, encircled by six miles of substantial wall, is built on the plain round three small

hills Running from the south gate of the city towards the south for 4 miles is a densely populated line of suburb, broken only by the stone bridge which, abreast of the settlement, connects the north bank of the Min with the island of Nantai. Around the settlement this suburb expands into quite a small Chinese town, so that the hongs and houses of foreign residents are either surrounded by the abodes of living natives or by the shallow graves of the dead. On the river, a little above the settlement, several thousands of a boat population find an anchorage.

The city, like most other Chinese cities, is remarkably dirty. Its suburbs, excepting the expanded portion in the neighbourhood of the foreign settlement, which, from its raised and sloping position, gets well washed during heavy rains, are equally dirty. The streets are narrow and filthy. Down the centre of the narrow granite-paved streets, just under the flagstones, runs a narrow drain, into which all sewage, save nightsoil, falls. Nightsoil from the city and suburbs is scrupulously collected, and carried at all hours of the day in open buckets into the surrounding country, where, until required for use in the fields, it is stored in chunam tanks.

The climate is moist and enervating, rainfall and thunderstorms are scattered over the year, but are more abundant in spring and early summer, when, almost annually, the Min overflows its banks, flooding the rice fields and a good deal of the ground on which houses are built.

During the summer months southerly breezes, following the course of the Min, reach us from the sea, but, owing to our mountainous surroundings, there is a great absence of windstorms, which would prove so serviceable in diluting and carrying off the abounding noxious effluvia from rice fields, drains and graves.

The really hot months of the year are June, July, August and September. Then the thermometer in the shade, seldom rising above 96° or falling below 70° , averages $83^{\circ}5$. The coldest months, December, January and February, have a mean temperature of 53° . The thermometer seldom falls below 40° . Frosts and ice are of rare occurrence and slight in character. In some years snow has been seen on the summits of the surrounding mountains.

Sudden and marked changes of temperature occur at all seasons, but are more numerous in spring than autumn, and more frequent in those periods than during the rest of the year. Every year in mid-winter there are some hot days when the thermometer in the shade rises to 80° .

The natives have not the healthy appearance of those living in the mountains or of those living on the sea coast. Their temperament is more irritable, and, though industrious, they have not the push or enterprise of their brethren in the southern part of the province.

In the city and suburbs most of the natives find employment in various trades and manufactures, while peasants occupy the villages on the plain and some parts of the suburbs.

The staple articles of native diet are rice, sweet potatoes, salt fish and pickled cabbage. Wheat flour (used in making pastry), pork, goat and beef are the luxuries of the rich.

Water is obtained from wells and from the river, but from either source is of doubtful purity. As elsewhere in China, natives seldom drink water that has not been cooked, and none ought to be used unless previously filtered, boiled, and re-filtered. Salad washed in unfiltered water may be the cause of the frequent occurrence of lumbrici among Europeans.

Having around us so abundantly all the acknowledged conditions necessary to the development of the bacillus malarie, or whatever the germ of paroxysmal fevers may be, we

need not be surprised at malarious diseases, as remittent fever, ague in all its forms, anæmia and dyspepsia being very prevalent among the natives. Vaccination among so conservative a people as the Chinese having made but slow progress, annually, during winter, small-pox visits almost all those who have not been protected by inoculation or by a previous attack of the disease. Besides these, among general diseases we have chicken-pox, measles, mumps, whooping-cough, erysipelas, rheumatism, cancer, leprosy. Syphilis is rare in all degrees of violence. Asiatic cholera has not been seen since the epidemic of 1877, when it visited most other ports of China and Japan. I believe typhoid and typhus fevers are endemic. Of local diseases, skin and eye diseases, catarrhs, bronchitis, phthisis, pneumonia, diarrhoea, dysentery and lumbrici are the most common.

For foreign residents, living in houses in every way suited to the climate, having abundance of every variety of good and cheap food, and having every facility for obtaining moderate exercise, the climate need not be considered unhealthy. Among Europeans, as among natives, malarial affections are the most common, then come rheumatism, diarrhoea, dysentery, bronchial catarrhs, dyspepsia and lumbrici. Living in greater proximity to Chinese than members of most other foreign communities in China, there is a greater risk of any infectious epidemic prevailing among natives extending to foreign residents. Nervous affections, etc., so common among ladies, though to a great extent dependent on a somewhat enervating climate, are in a great measure preventible. Males who observe moderation in all things, avoiding violent exercise as much as intemperance in eating and drinking, seem to enjoy excellent health. All that relates to men applies in a limited degree to women, and I do not think that temperate exercise could do otherwise than raise the standard of health of women, as well as preserve the health of men, and so aid in warding off climatic disease. Nutritious food, with insufficient exercise in the open air, leads to the accumulation of effete matter in the system, lowers the standard of health, and hence the frequency of nervous and other affections among ladies. Those of the male residents who lead inactive lives suffer from nervous ailments, and are much more affected by climatic influences than those who choose the middle course. The busy season of the year falling in the hot months, by enforcing active and regular habits, doubtless renders climatic disease among male residents less frequent. The benefit derived from active habits may be well illustrated by comparing the active, healthy, robust native women from the country, frequently seen in the settlement, with the indolent, withered-looking women of the city and suburbs.

During summer, when the country is clothed in vegetation, beautiful views may be had in all directions from the settlement. For those suffering from enervation and the cramped conditions of settlement life, there are at all seasons excellent retreats. On the prominent headlands, where the Min joins the sea at Sharp Peak, those depressed by summer heats may enjoy refreshing sea breezes and cool nights. The favourite resort of some who wish to avoid the hot months of summer is the large Buddhist monastery half-way up Kushan, a mountain 3,000 feet in height, which rises from the left bank of the north branch of the Min, 6 miles below the settlement. During the cooler months there is every facility for excursions up the main river and its branches. There mountain scenery, almost unrivalled in beauty and grandeur, abounds. Bamboo, many varieties of coniferæ, ferns, and all sorts of flowering shrubs and plants

adorn the slopes, and dispersed over the mountains are varieties of game sufficiently abundant to render a sportsman's rambles doubly enjoyable.

Lately the community has been very fortunate in acquiring a piece of land for a recreation ground, and it is hoped that all residents, both male and female, will avail themselves of the salutary advantages derivable from such an acquisition.

The following thermometric observations, taken with NEGRETH & ZAMBRA'S best instruments, suspended from the wall of the verandah of a house facing the south, about 50 feet above the level of the river and 20 feet from the ground, give some idea of the temperature in the settlement during the past eight months —

YEAR AND MONTH	Mean of Day Maximum	Mean of Night Minimum	Mean of Maxima and Minima	Mean Range during the 24 Hours	Greatest Range during 24 Hours
1880					
August	83° 34	78° 8	83° 57	9° 5	11
September	85° 9	78° 59	82° 39	7° 1	10
October	73° 6	70	71° 8	3° 6	14
November	71° 1	57° 7	64° 4	13° 4	30
December	56° 1	47° 1	51° 6	9	23
1881					
January	59° 4	47° 2	53° 3	12° 2	20
February	60° 5	52	56° 25	8° 05	16
March	57° 40	49° 16	53° 28	8° 24	16
Mean of Eight Months	69° 04	60° 10	64° 57	8° 88	17° 50

The greatest range during the year was 53°

The summer season was throughout unusually wet. In June, in the settlement, over 12 inches of rain fell, and at the beginning and middle of the same month two strong freshets caused by heavy rains up country, occasioned great anxiety to the natives as to the safety of their houses and crops. Though not so high as the floods of 1876 and 1877, they were quite sufficient to flood the rice fields and other low-lying ground. Slight rain fell on five days in October, in November no rain fell, and in December the rainfall was but trifling. January had several hot, damp days, and in February and March the rainfall was considerable.

Among foreign residents during the past 12 months there were 10 births. No deaths occurred, but, owing to the prevalence of climatic and other affections, the year cannot be considered a healthy one. Malarial fevers, for the most part of the intermittent type, were common in all seasons, and affected 35 per cent of the residents. In all parts of the settlement, among houses situated on the highest points as among houses built on sites little above the plain, fevers were equally scattered. Coryza and bronchial affections ranked next in frequency. Rheumatism and neuralgia were frequent during the wet months of spring and summer. Cases of diarrhoea and dysentery were more frequent than usual. Foul vapours inhaled from paddy fields, drains, etc., may have acted as predisposing causes, but exposure of the body, especially of the abdomen, during sleep, while perspiring, seemed the principal cause. Among 150 residents under supervision, there were nine cases of dysentery, all proved most amenable to the ordinary treatment by ipecacuanha. Summer diarrhoea among children, without doubt caused, as in adults, by chills either by night or by day, was found most tractable to treatment, and, beyond

slight prolapsus ani in one case, presented no abnormal features. There were several cases of inflammation of the external auditory canal, sometimes associated with onychia maligna, or with obstinate ulcers on other parts of the body.

As usual, there were numerous cases of *lumbri* among children and adults.

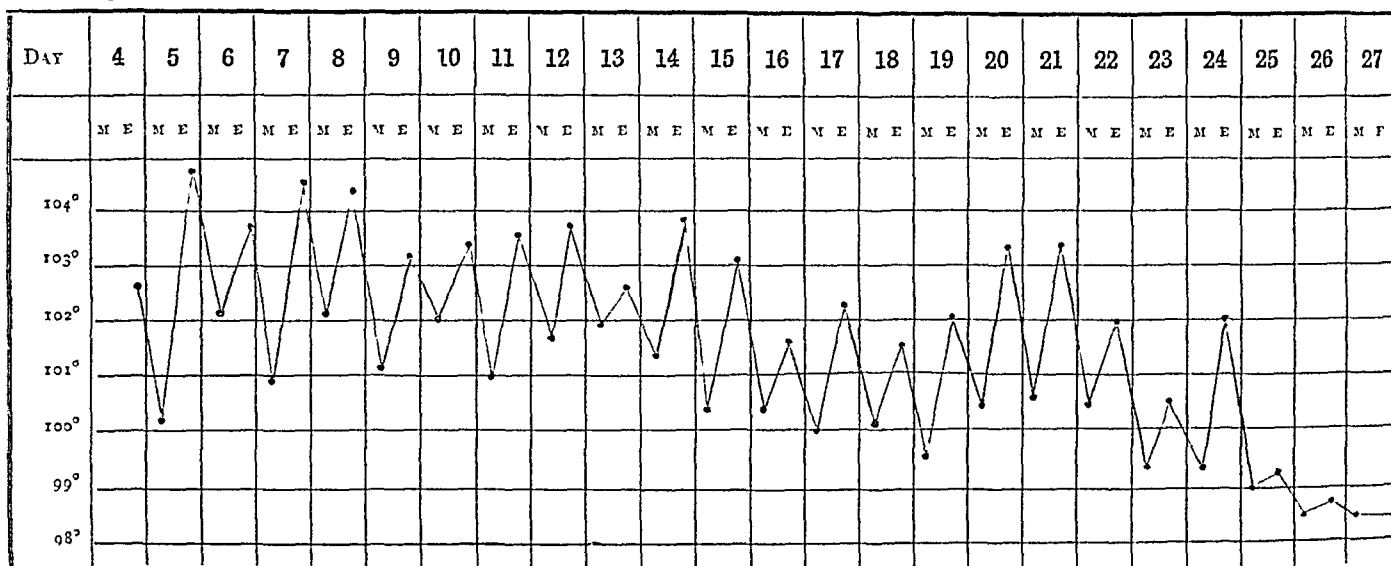
In May last, while an epidemic of parotitis existed among Chinese, four Europeans had mild attacks of the malady.

Of continued fevers, there were three cases of typhoid or enteric fever, two cases of modified small-pox, and four cases of a continued fever of the remittent type over which quinine had no influence whatever.

The small-pox cases were extremely mild, and the infection was traceable to an amah who had visited her relatives while they were suffering from the disease. With small-pox annually in the neighbourhood, it seems difficult to avoid infection. All ought to be well protected by vaccination and re-vaccination, and it might be as well, especially in families, to refuse leave to servants during January, February, March, April and May, when small-pox, measles and parotitis are so common among natives.

One case of typhoid fever, in an adult, occurred in October, and the other two cases, in children, in February.

The following diagram shows the morning and evening temperature, taken in the axilla, of the first patient —



The patient, 25 years of age, after several days' experience of persistent headache and general malaise, was compelled by sickness to go to bed, and, on the presumption of the disease being of malarious origin, quinine in large doses was administered. The physiological effects of quinine were produced, but having failed to influence the course of the fever, the drug was abandoned. Towards the end of the first week, diarrhoea, with evacuations having all the characters of the typhoid stool, commenced, and, though always easily controlled, continued throughout. Slight epistaxis occurred at intervals. Rose coloured spots were seen on the abdomen during the second week of illness. There was slight abdominal tenderness, but no marked guarding on pressure or special tenderness in right iliac region. Prostration of strength was marked from the first. The tongue was covered with a brownish fur, but never became dry or fissured.

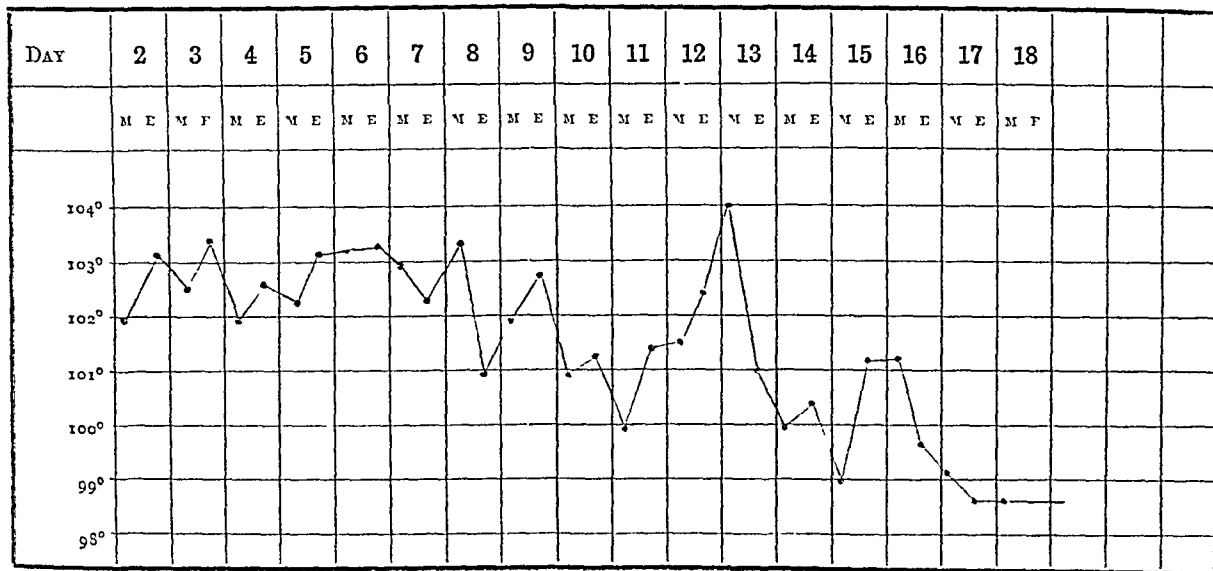
The spleen was distinctly enlarged. After the suspicion of enteric fever as the cause of the illness, beyond small doses of Dover's powder to control the diarrhoea, no medicines were given.

In the case of the children, who were brothers and lived together, the contagion seems to have originated from the emanations of over 30 excrétæ tanks, occupying a piece of waste ground a few yards from the house gate, where the children spent a great part of their time in watching passers-by. The tanks, with mouths level with the ground, about 10 feet deep and from 3 to 8 feet in diameter, are, as has elsewhere been mentioned, used for storing nightsoil until required in the adjacent rice fields. The tanks are never covered, and at times emit appalling stench. Having failed to discover any other source, it seems most probable that the children inhaled the contagion from the tanks, into which the dejections of some native suffering from enteric fever may have, along with other excrétæ, been cast. A case of typhoid fever in a native has not come under my notice, but fever cases of any kind seldom come to hospital for treatment. Frequently patients suffering from debility, having the listless, exhausted appearance of those convalescing from enteric fever, and having a previous history of two months' fever with diarrhoea, visit the hospital.

The only traceable source of contagion in the case of the adult is the well from which the water supply of the patient's house was obtained. The well, distant from the house about a quarter of a mile, is on a lower level than many of the Chinese vegetable gardens surrounding it. The nightsoil tanks from which the gardens are supplied with manure are only distant a few yards from the well, and filtration from the gardens or then tanks into the well must constantly occur. The house stands by itself, high on the hill, and is supplied with earth-closets, whose contents, along with other refuse, are carried off twice a day. There are no drains or channels of any kind to carry off slops. A standing order exists as to boiling water previous to filtering, but, unless under personal supervision, the orders are habitually disobeyed.

Just a year before, in the same house, a typical case of typhoid fever occurred.

The following diagram shows the temperature, taken in the axilla, of one of the four cases of remittent continued fever over which quinine in large doses had no effect —



The four cases occurred during the winter months. In all, the fever commenced suddenly, with rigors and intense headache, and in 17 days ended somewhat abruptly. Only in one case was there slight delirium. Enlarged liver and spleen, diarrhoea, or any kind of rash were, in all, absent. At first a laxative was given, followed by a 30 grain dose of quinine for three mornings, but as quinine proved of no avail, all medicines were laid aside in favour of careful feeding and nursing.

The only epidemics present among Chinese during the year were parotitis, small-pox, measles and malarious fever, which in a more severe form than usual, was epidemic in September, October and November, when rainfall was slight, and when the rice fields were drying up.

Eighteen months ago, through the liberality of the foreign community, assisted by Chinese, a native hospital for the treatment of in and out patients was opened. 388 males and 31 females were treated in the wards, and 1,848 males with 201 females received relief as out-door patients. Several operations were performed, including two excisions of the breast for cancer, and the removal of many benign and malignant tumours. Six cases of elephantiasis of the scrotum were operated on, the tumours weighing respectively 3, 5, 8, 16, 23 and 30 pounds. Under the prepuce of one patient, who had suffered from phimosis for seven years, were found 315 phosphatic calculi, weighing 6 drachms.

With a view to determine the frequency of occurrence of the "*filaria sanguinis hominis*" among hospital patients, the blood of in-patients was examined under the microscope at 9 o'clock every evening over a period of five months (August–December 1880). 182 patients were examined, and embryos found in the blood of 25.

The diseases from which the 25 patients suffered were as follows —

Ulcer of leg	3	Hæmorrhoids	1
Dyspepsia	4	Carcinoma	1
Syphilis	3	Necrosis of tibia	1
Anæmia	4	Chronic rheumatism	2
Lymph scrotum	2	Curvature of spine	1
Conjunctivitis	2	Lumbici	1

Of the 25 cases, 6 had slightly enlarged glands in the femoral region, 2, as stated above, suffered from lymph scrotum, among the others there was no history of chyluria or other affection associated with the presence of *filariæ* in the blood.

Among the 182 cases examined were 3 cases of old-standing elephantiasis of leg, and 4 cases of elephantiasis of scrotum, in which repeated examinations of the blood failed to detect embryo *filariæ*. Of the 25 cases in which embryos were found, 14 resided in Hokehchia, 6 resided in Henghoa (towns near the coast between Foochow and Amoy), and 5 resided in Foochow.

F—D₁ P MANSON'S Report on the Health of Amoy for the Half-year
ended 31st March 1881

DURING the six months there have been three deaths in the foreign community —

- | | |
|--------------------------|---|
| 1 An infant | Infantile paralysis |
| 2 Male adult from Tamsui | Chronic dysentery and diarrhoea |
| 3 Male adult | Spine, and paralysis from brain disease |

There was nothing of special interest from a medical point of view about any of these cases

The general health has been excellent. The spring small-pox epidemic has not been particularly virulent or widespread among the natives, and only one foreigner has been attacked.

I saw several cases of extensive pneumonia following measles in Chinese during February and March. Though measles is at present epidemic in the native town, foreign children have hitherto escaped.

G—Dr W W MYERS'S Report on the Health of Takow for the Two Years
ended 31st March 1881

DURING the period under review the health of the community has been very good. Indeed, the diseases peculiar to this place, as far as foreigners are concerned, appear to be few.

The climate is good, and, considering the geographical position, the drawbacks consequent on heat by no means so great as one would expect. The fresh sea breezes, which have full access to the settlement, must be credited with a great deal, as we find that in Taiwan-fu, the capital city, distant about 30 miles to the north, and more shut in, a similar condition of salubrity can scarcely be said to exist.

Here the settlement is divided into two by the intervening lagoon, the seaward and south boundary of which is formed by a long, low sandspit. Some of the houses built on this do not enjoy the immunity from malarial diseases which is possessed by those erected on the other side, and this may be accounted for by the proximity of dense vegetation, and, above all, by the fact that almost the whole spit is one enormous graveyard, in which bodies are interred with but scant regard to ordinary hygienic requirements. On the whole, however, residents in Takow have little to complain of (in evidence of which may be noticed the excellent health enjoyed by children while living here), and attacks of ague, save in the case of those who chance to take up their abodes in the two most southern dwellings on the spit, are but of comparatively rare occurrence. The greatest inconvenience to be borne by residents is the want of good food. With the exception of fowl, fish and intermittent supplies of very inferior beef, the commissariat is poor in the extreme, and this no doubt renders life here less enjoyable than it would otherwise be. Again, the comparative isolation from the rest of the world is a factor in producing discontent, but this is of somewhat recent origin, as in the old days, when schooners used to run frequently to and from Amoy, communication was more frequent and regular than at present, with the fortnightly steamer coming to Anping, distant 21 miles, and often detained by weather for periods longer than those nominally appointed.

Mortality—It is a fact worth recording that in the cemetery in use since the port was opened there is not one grave the tenant of which has succumbed to disease directly or indirectly ascribable to climatic causes. For the two years under review, the following is the death return—

1	Cardiac Disease	Male, 1879, resident		
2	Anæmism	"	"	"
3	Cardiac Disease	"	"	"
4	Phthisis	"	1880,	"
5	Bright's Disease	"	"	"
6	Typho-malarial Fever	"	"	non-resident
7	Myelitis	"	"	"
8	Drowned	"	"	"
9	Phthisis	"	"	"

Case No 1 was an old resident No 2 was also a man who had been in the island some time, and who up to the moment of his death had apparently enjoyed the most robust health, at no time had any symptom of the lesion from which he suffered manifested itself No 3 had been only three months here when he died, he happened to have been seen by me nine years previously in the north of China, when I warned him of the grave condition of his heart No 4 was in old-standing case, he had but recently returned from England, where the disease had first manifested itself No 5 had resided about two years in Anping No 6 was in the person of a sailor who arrived moribund in a vessel from Japan No 7 was also a sailor from a vessel visiting the port No 8 was a sailor drowned on the bar, and No 9 was the steward of an American ship who had for long suffered from consumption

It will thus be seen that, large as this list is, none of the diseases were fairly attributable to residence in the place

Climate in Relation to Disease—Under this head I must notice the very favourable effect residence in South Formosa would appear to exert on tuberculosis It would seem as though arrest of disease may often be brought about, and in every case I have noticed that the painful concomitants and consequences are considerably and favourably modified Case No 4 had the strongest possible hereditary and general tendency to consumption, but during his previous residence here, extending over several years, had enjoyed vigorous health, and it was not until he arrived in England, and had been subjected to the influence of its fitful climate, that the germs so long dormant burst forth with a vigour which soon brought about the result recorded I have had other cases which I feel sure were materially benefited by their stay in Takow

Hospital Accommodation—There has been for many years located in Takow a hospital for natives This, started at first by Dr MAXWELL of the English Presbyterian Mission, was in turn handed over to Dr P MANSON, the first community physician He was succeeded by the late Dr DAVID MANSON, after whom came Dr THOMAS RENNIE (now of Foochow), and on his leaving the charge devolved on me

Soon after its institution the hospital was supported in part by the contributions of the foreign firms and those of the other residents, and at present is entirely kept up by these and native subscribers In 1878, when Dr DAVID MANSON's untimely death took place, his numerous friends here, in Amoy and elsewhere (native and foreign) determined to erect a memorial of one who had, even during his comparatively short career, made himself beloved and esteemed by all who knew him After much consideration it was determined to erect a new building for the purpose of carrying on the good work which Dr D MANSON had taken so prominent a part in furthering, and at the same time secure a memorial which would be of the most permanent and suitable kind The money was speedily forthcoming, and early this year the "David Manson Memorial" Hospital was first opened for the reception of patients, foreign and Chinese His Excellency HU Taotai was to have presided at the opening ceremony, but the unexpected arrival of the Futai at Taiwan-fu caused him to hurry back before carrying out his intention In lieu of this, however, he set forth proclamations declaring the object of the institution and his sympathy with it, which notices he caused to be posted throughout the county, at the same time giving substantial proof of his interest by putting his name down as an annual subscriber for ₳100 His example was followed by the Chéntai, to the same

amount, and several other officials and natives have become annual donors of sums varying from \$10 to \$25

The hospital consists of two buildings. The lower two-storied house accommodates about 12 foreign patients upstairs, and below is the dispensary, operating-room, waiting-hall and dispenser's quarters. The upper building consists of two large wards for native patients, while in rear of this are two rooms for private Chinese patients or for women, besides which is accommodation for cookery, washing, etc. The whole contains room for about 30 beds, although doubtless on an emergency arising, more could be made up. The hospital is situated at the base of Saracen's Head, facing the lagoon or inner harbour, and is on perhaps one of the most salubrious sites in the whole settlement. I must not omit to mention that this ground was presented by the Chinese Government.

There are two classes of wards for foreigners, those in the first class paying \$3 per diem, while the charge for the second and general ward is only \$2. This includes attendance, board and medicines, and it is hoped that from these wards some little aid towards the general support may be obtained. I need scarcely say that to the natives everything is gratuitously given.

It is undoubted that an institution of this kind must do a great deal of good apart from its mere medical bearing, and I fancy that there are but few places where the *entente* between foreigners and Chinese is more declared than in Formosa. Even the uncivilised aborigines are not above seeking aid, and only the other day we had quite a crowd of these "savages," who had obtained passports for the purpose of testing the powers of Western medical skill. During the past 10 years upwards of 20,000 patients have been treated. I do not give a detailed nosological list, as this would not differ in any material points from those already published in previous Reports, where the class and general type of diseases seen have been fully set forth. During the past two years more than 3,900 patients have been seen and treated, with a comparatively small death rate, notwithstanding the strong tendency of the impecunious natives to foist their moribund friends on us, in order to avoid the funeral expenses.

Opium-smoking—I am aware that in trenching on this subject I enter very debatable ground, and I am not unmindful of the strong opinions held on both sides of the question, but I can at least say that I have neglected no opportunity during the past 10 years of closely investigating the matter, while circumstances have more than once been particularly favourable for making the necessary observations.

Looking back at many of the various arguments produced on either side, it has often struck me that their force has in several instances been modified by the uncontrolled enthusiasm of the disputants. Thus, those who argue from the "no injury" point of view are very apt to run into the extreme of asserting "positive benefit," while those, again, who urge that the use of opium is noxious to health and prosperity too frequently ascribe to it a universality of destructiveness which cannot be borne out, save in cases where intemperance in the use of the drug is as marked as is the violence of language adopted by its critics.

I think I may fairly claim to rank among those who speak from an entirely disinterested point of view, and therefore for the purpose of this Report I put for a moment aside the moral aspect of the question, and, confining myself simply to the professional bearing of the subject,

narrate as shortly as possible the observations I have made, and leave in great part to others the task of drawing what conclusions they think proper from the data I shall attempt to lay before them

In Formosa the use of opium is indulged in by a great proportion of those of the inhabitants who are either themselves immigrants or the descendants of colonists originally coming from the mainland. In the south part of Chéhkiang, where I was before coming here, the opium pipe is also in very general requisition. It would seem to me that both here and generally over China the smokers may be divided into two classes. 1°, a minority, who, being either officials or well-to-do persons, can afford to give vent to their passion, and indulge to an extent which would in many cases quite justify the worst that has been said as to the effects and consequences of the vice, and 2°, the majority, consisting of persons who are obliged to work hard for a living, and among whom moderation is the rule. I am bound to say, however, that even among the former the use of the drug is usually for a considerable time tempered with more or less moderation, and that many years of unimpaired usefulness are thus enjoyed ere that condition is attained which so justly calls for commiseration.

Here as elsewhere the grand prompter to excess is the co-existence of that idleness which in many parts of the world is often thought to be the privilege of wealth. Hence, as far as my inquiries go, we do not meet the extreme effects of over-indulgence so frequently among officials, or at any rate so early a manifestation of its most baneful effects, as among those who, independent of exertion, give themselves up entirely to that indolence which is prone to seek among the vices generally for relief from otherwise unbearable ennui. On the other hand, it is not quite fair always to attribute to opium-smoking those fearful concomitant vices which are often depicted as its consequences. That they are frequently coincidences, or that they sometimes precede and at others follow, indulgence in opium I am aware, but still, though excessive smoking may hasten the effects of a general moral depravity, I am inclined to think it is much more often rather a sequence than the cause.

Taking one from this class as a type of opium-smoking carried to its due end, we shall find that probably he began smoking from 10 to 20 or 30 years previously. When young, and before becoming entirely enslaved, he smoked from 1 to 2 mace weight per diem. The increase in quantity was probably gradual during the first 10 years, until at the end of that time it reached, say, 3 to 4 mace in the day. During this period he did not feel much the worse for his habit. He smokes thrice daily, once in the forenoon, again after the mid-day meal, and finally in the evening. This latter extends more or less far into the night, in proportion to the degree of his infatuation.

Presume him to be an official, or a man who, though well off, is still engaged in some business occupation, and so long as the requirements of his business necessitate diurnal business, he may not exceed the maximum I have stated, but should either the advance of his prospects render further excess possible, or an inability or disinclination to resist the allurements of the drug prompt him, the progress is rapid, until he reaches a daily consumption of from 7 mace even up to 1 tael. With this advance begin those outward manifestations of decaying mind and enfeebled body which have been so often depicted. The pipe is seldom out of his mouth, his hours of mental lucidity become fewer and fewer, he scarcely ever

obtains natural sleep, he wakes dull and heavy, to be briefly flashed into temporary consciousness by the first whiff of his pipe, quickly relapsing into semi-stupor. His bowels are constipated for periods sometimes of 10 days, his appetite is almost gone, his digestion of the weakest, he becomes sexually impotent, and so on, until at last, intensely anæmic, extreme debility is further aggravated by the characteristic diarrhoea, and he finally passes away unregretted from the world in which for so long he can scarcely be said to have mixed.

Opium-smokers will tell you that there is a point (varying with different men, and regulated by the general energy of their lives) up to which they can go with impunity. One very intelligent old gentleman, who said he had smoked for 30 years, and at that time seemed to be, as he said he was, tolerably healthy, told me that he never exceeded a certain quantity, in fact, that this was the maximum he allowed himself on festive occasions, but that there was a lower rate, which was quite sufficient to give him all the satisfaction he required, and this was his ordinary allowance. He had varied but little, he said, for the last 15 years, and felt no irresistible temptation to do so. He was 50 years of age, and was engaged in active mental occupation as a large merchant. He thoroughly enjoyed his pipe, and admitted he could not do without it. He suffered from constipation to a greater extent than non-smokers do (the Chinese generally are much subject to this), but he was not aware that it affected him. He ate well, and after his evening pipes had sound and refreshing sleep, rising about 11 o'clock each day. He was not by any means impotent either as to desire or efficacy, and pointed to a son aged 4 years as a proof of this. He said that, as far as he knew, many others were like him, and that although, of course, there were several who made no effort to control the amount of opium used, still he did not think until the evening of life came it was by any means the rule for opium-smokers to abstain from doing so. He instanced officials who, he said, often adjusted their indulgence by the leisure available, *ie*, the rank or appointment they held. Of course there were many cases of persons who rushed deeply into the bonds of opium, "with them there was no thought of what amount could be borne, but rather, it would seem, what quantity could be consumed in the time vouchsafed."

Not taking all my friend said as being literally exact, still I found it a very good standard for comparing my own observations, and I have been struck by the amount of truth there was in the statement. That point of there being the safe and satisfying maximum to which every man might with comparative impunity indulge seems curious, but I have been repeatedly assured of it by many most confirmed opium-smokers. Several that have admittedly gone far beyond it, and were exhibiting all the consequences of their imprudence, have told me the same, and in their own cases have named the date from which they reckoned their downfall. I have also made a point on many occasions of closely questioning and examining those who have avowedly kept within the alleged limits of immunity, and I have seen no reason to question their assertions. I may here mention an interesting fact, and that is that in the case of the poorer classes, to be hereafter spoken of, under pressure due to reduction of means, a comparatively small amount of opium suffices to overcome or satisfactorily modify the craving and other unpleasantness which, as far as I could discover, invariably follows a sudden cessation of the accustomed indulgence. The highest amount smoked in a single day with *alleged* safety was 5, while the lowest rate quoted was 3 mace, but it must be remembered that Chinese of this

class would scarcely notice anything that did not interfere with, say, 6 or 8 hours' attention to duties, shorten life, or set up some marked manifestation of illness, and thus, probably, if we contrasted the condition they call perfect with that we should describe as belonging to the typically healthy, we should find several shortcomings. Again, it must be remembered in quoting these quantities that the manner of smoking has to be taken into account, the affluent rapidly refilling the bowl, and not nearly exhausting the charge, which often affords considerable enjoyment to humbler votaries, who re-smoke it.

To turn to the other class (and this includes a vast proportion of the general public), one will be really surprised to find how comparatively few there are who indulge to disastrous excess. Case after case will be met of men, even in the lowest ranks of life, who have smoked regularly for from 10 up to 20 or even 30 years, and who, as far as we can discover, show little or no signs of mental or physical degeneration. Taking the average amount of opium consumed by these, I found it to be from 1 to 2 mace per diem. Here in Southern Formosa there is a class of men, including the coolies, chan-bearers and couriers, who daily do an amount of physical work that is remarkable in its extent. These have for years been in the habit of taking a certain quantity of opium during the day, seldom or never varying it, and they assert that by so doing they at least attain a greater degree of comfort in carrying on their labours, and, with but very rare exceptions, I must admit that I have failed to obtain evidence which would justify me in attributing any marked harm to their habit.

Of course, among every class of men there are those to whom moderation is impossible, and who, in the gratification of their desires, will drag themselves and those dependent on them to the lowest misery. This we find one of the greatest evils connected with alcoholic intemperance, but I must say that my experience both here and in other parts of China would go to support the statement that the use of opium through the medium of a pipe does not, at least up to a certain point, so irresistibly and inherently tend to provoke excess as undoubtedly is very often the case with the stimulants commonly indulged in by foreigners. Were the seductive powers of opium so great and cumulatively overwhelming as has sometimes been asserted, I cannot but think that among the class of which I am now speaking, dependent as most of them are for a livelihood on their exertions, we should have a very much greater number of instances of its disastrous effects on pulse and person, but I do most conscientiously state that although I have met with instances in which the effects were most marked and deplorable, still, when considered in numerical relation to the numbers who smoke opium, I have been struck with their paucity, and my preconceived prejudices with reference to the universally baneful effects of the drug have been severely shaken.

If I were asked the question as to whether I believed the use of opium necessary or even harmless, I should be inclined to reply that both queries required specific and relative answers. We know in medicine that under certain conditions the exhibition of opium is not only gratefully but beneficially borne, and that this is in direct relation to the cause which called for the administration, *e.g.* pain. Without going deeply into the rationale of the process, the physiologist could perhaps imagine a condition, such as might be induced by arduous physical or mental toil, where the moderate use of opium might be even beneficial, or where at least by imputing comfort its injurious effects (if any) might be neutralised. We know well that the

population of China—I am now alluding to that portion which, while forming the vast majority, would be those who could least afford to indulge in a practice materially affecting either their health or their fortunes—I say we know that these are, as a rule, industrious and laborious to a degree. Whether they could get along just as well—nay, perhaps better—if for opium was substituted some less suspicious restorative—*eg*, better and more nourishing food—is a suggestion that would undoubtedly admit of interesting consideration, but as I am at present only dealing with the state of affairs as we find them, I need not dwell further on the question of possibilities.

Again, whether in view of the enormously preponderating amount of opium cultivated in China, Indian drug should ruffle the sensitiveness of our national conscience to the extent some would seem to think proper, or whether the obstacles (if any) to international *entente* are so much supported by the import of opium, *per se*, as by the various unpleasant incidents of a past, when other articles of import had little or no chance of acting as irritants, I take it does not concern me at present.

As contrasted with the drunkard, the opium sot decidedly has the advantage—that is, as far as his bearing to his fellow-beings goes, for whereas one, under the influence of liquor, is noisy, quarrelsome and often dangerous, the druggard (if I may for convenience coin a word) is at least quiet and orderly. That abuse of alcohol is a marked factor in the production of crime of the most heinous nature all will admit, while, as far as I can learn, opium comparatively seldom leads to crime, and even then this rarely, if ever, attains to higher dignity than petty theft.

Dr TANNER, in his standard work on Practice of Medicine, suggests, in the case of confirmed dipsomaniacs, the substitution of opium-eating for wine-bibbing as the lesser of the two evils. Opium-eating, however, seems to me to stand on a very different footing from smoking. It would appear that when taken by the stomach incessant and cumulative craving is much sooner set up, that rapid increase of dose is absolutely necessary, and that the drug soon obtains the mastery, concentrating, both in time and vigour, its most disastrous effects. Except at advanced stages of the opium-smoker's career, one does not hear of sufferings and other manifestations such as have been so graphically depicted by Dr QUINCEY, but at a very early period the opium-eater begins to complain and show marked symptoms of the sad effects of his vice. I have had some opportunity of contrasting the two effects, and I feel justified in asserting that smoking as compared with eating opium is as different as the excesses of the *bon vivant* are from chronic, hopeless dipsomania. The smoker may after a comparatively long period reap the painful fruits of his indiscretion, with the eater the consequences begin almost directly.

We must also consider the difference between the two modes of introduction into the system, the one process by which but a small proportion of the drug consumed can obtain access, and the other by which not an atom of the poison can escape, added to which are the local derangements set up in the alimentary canal by repeated calls for an exercise of its functions on that which by mere contact proves injuriously obstructive to the natural processes exerted for its assimilation.

This brings me to the subject of remedies for the cure of opium-smoking, and the question as to whether it is advisable, to however slight an extent, to substitute for the inhalation of the drug its administration in solid form

Medical men in China have, as far as I know, as a rule, followed the plan of giving opium or morphia combined with some strong tonic such as quinine or strychnine, gradually and rapidly decreasing the amount of opium and increasing the dose of tonic, adding now or some similar medicine, until the patient has lost the desire and been strengthened by the remedies administered. The late Dr OSGOOD of Foochow was, I am told, the first to commence the cure of opium-smoking by immediate and total deprivation of the drug, substituting for it chloral hydrate, which, with tonics, he gave in the form of pill. Dr DUDGEON of Peking, from his recent strong denunciations of the use of opium in the system of cure, I assume also disapproves of the old method, and I observe that Dr LYALL of Swatow treats all his cases without opium. I myself have hitherto followed the beaten track, and provided, of course, the patient is watched and the opium rapidly diminished, good results have followed the treatment. I have, however, been led to fear that the number of smokers really desirous of being cured is very small, and too often application to the foreign physician is merely to tide over some temporary inability to procure the drug, to which they return as soon as circumstances prove favourable.

One of the greatest obstacles to the permanent cure of opium-smoking in individuals, as I am convinced it will prove the great bar to all efforts at putting down the general use of opium in China, is the despotism of the tyrant Fashion. To present the pipe, to join in its participation, has become the almost universal sign of courtesy and hospitality. No business can be completed nor acquaintanceship inaugurated without its aid, and in fact it would be a tremendous strain on the not unlimited moral courage of the native were he to refuse to present or join in the fashionable civility. In some few instances a show of privacy is kept up, but I have reason to think that even this semblance of deference to those theoretical moral platitudes Chinese know so well how to write and utter is fast passing away, and I am bound to admit that although I have in my time had a considerable number of applicants for treatment, and many have undoubtedly been "cured," I cannot recall a single instance where I was sure relapse after a longer or shorter time did not take place, and it was ever the same excuse — "I can't help it, my friends all smoke, and if I do not they will leave me, and I shall lose my business" or "face," as the case might be.

I think all medical men agree that unless patients are under immediate observation, little can be done, and if the remedy used contains opium, and thus be dispensed to all and sundry, facilities are offered for setting up the greater evil of opium-eating. As a fact, this has actually happened in Formosa. Several years ago, at the missionary hospital at Taiwan-fu, the cure of opium-smoking used to be effected by pills in the first instance containing opium combined with strong tonics. Of course the patients obtaining the pills were kept under the supervision of the doctor and had their doses of opium rapidly diminished until total deprivation was arrived at, in a word, they were treated in the usual and rational way. Observing, however, that opium administered by the mouth proved for the time as effectual as smoking, and naturally ignorant of the more speedy disaster liable to follow its habitual

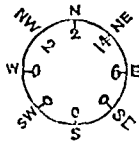
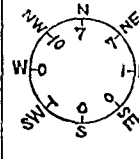
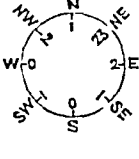

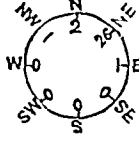
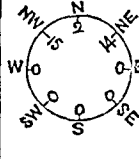
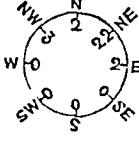
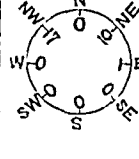
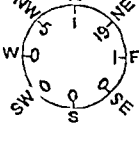
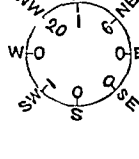
use in this form, having also its great cheapness to support it, some of the old employés of the hospital have by means of their agents instituted an enormous sale of so-called "great foreign opium pills" In some cases these pills are made from crude opium purchased in the native shops, but in the majority of instances are manufactured with the pulvis opii of the Pharmacopœia or with muriate of morphia The opium pills contain from $\frac{1}{4}$ to 1 grain, made up with some aromatic mess obtained in the Chinese medicine shops, and the morphia pills from $\frac{1}{4}$ to $\frac{1}{2}$ grain of the alkaloid, prepared in a similar way The first are sold at about $\frac{2}{3}$ of a cent and the others at 1 cent each They are dispensed indiscriminately by natives all over the country, though the chief dépôt is at Taiwan-fu I need hardly say that this is done entirely without the cognizance, still less approval, of those whose name is audaciously appropriated The result is that opium-eating is now becoming very common in the south of Formosa, and although it does not by any means supersede the use of the pipe, still, whenever from pecuniary or other causes this would not be convenient or available, resort is had to the pill One grain of morphia or 2 grains of opium swallowed is found to be equivalent to 1 mace of the preparation smoked, 1 mace = about 58 grains

To give an idea of the consumption of morphia, I may state that one man in Taiwan-fu alone imports upwards of 100 ounces of morphia per annum, which he uses in the manufacture of these pills

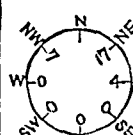
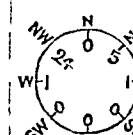

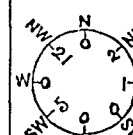

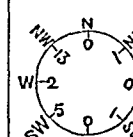
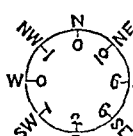
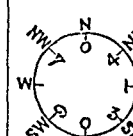

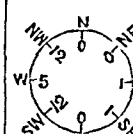
Applicants at either the Taiwan-fu or Takow Hospital are now treated without either opium or its alkaloid, but, in my experience at least, as soon as the patients discover the absence of their favourite drug, the anxiety for cure vanishes, as does also the *soi-disant* penitent

Meteorological—I am indebted to the harbour master for the meteorological readings from which I have compiled the appended abstract As will be seen, they only extend over the 18 months immediately preceding the 31st March 1881

ABSTRACT of METEOROLOGICAL OBSERVATIONS taken by the Customs, Takow, for the Eighteen Months ended 31st March 1881 Latitude, $22^{\circ} 36' 14''$ North, Longitude, $120^{\circ} 16' 0''$ East

DATE	BAROMETER		THERMOMETER				SELF REGISTERING THERMOMETER		RAIN IN 24 HOURS	WIND		CLOUDS		No of Days in each Month on which no Rain or Snow fell
			Dry Bulb		Wet Bulb		Max in Air	Min in Air		Summary of Direction		0-10		
	9 30 A M	3 30 P M	9 30 A M	3 30 P M	9 30 A M	3 30 P M	9 30 A M	9 30 A M		9 30 A M	3 30 P M	9 30 A M	3 30 P M	
1879	Inch	Inch	°	°	°	°	°	°	Inch					
OCTOBER —														
Max.	30 20	30 14	88	89	82	83	89	78 0				2 at 1 11 " 2 5 " 3 3 " 4 5 " 6 1 " 7 2 " 8 2 " 9	1 at 2 5 " 3 4 " 4 3 " 5 2 " 6 6 " 7 4 " 8 4 " 9 2 " 10	30
Mean	30 09	30 10	84.8	84.4	78.3	78.2	87	74.4						
Min	29 93	29 40	79	79	75	74	86.5	69						
NOVEMBER —														
Max	30 24	30 14	85	85	78	78	87	74	95			3 at 1 3 " 2 1 " 3 2 " 4 2 " 5 2 " 7 3 " 8 2 " 9 12 " 10	1 at 1 3 " 2 2 " 3 2 " 4 2 " 5 2 " 6 2 " 7 2 " 8 5 " 9 9 " 10	27
Mean	30 08	30 00	78.8	79.5	73.2	73.7	80.1	69	38					
Min	29 58	29 52	69	70	64	66	72	60						
DECEMBER —														
Max	30 22	30 25	81	81	75	74	88	67				9 at 1 9 " 2 1 " 3 2 " 4 1 " 6 2 " 7 2 " 8 3 " 9 2 " 10	4 at 1 11 " 2 8 " 3 1 " 4 1 " 5 1 " 6 0 " 7 0 " 8 0 " 9 5 " 10	31
Mean	30 12	30 08	72.8	74	65.3	64	78.7	60.6						
Min	29 32	29 98	60	65	57	53	67	55						
1880														
JANUARY —														
Max	30 37	30 31	73	77	69	71	82	65	1 08			1 at 1 2 " 2 3 " 3 2 " 4 3 " 5 2 " 6 2 " 7 3 " 8 5 " 9 8 " 10	0 at 1 3 " 2 3 " 3 3 " 4 1 " 5 1 " 6 1 " 7 1 " 8 2 " 9 13 " 10	25
Mean	30 19	30 12	67.61	70.93	63.28	66.19	72.35	65.41	46					
Min	30 02	29 95	56	59	51	57	58	50						
FEBRUARY —														
Max	30 27	30 20	78	81	73	76	83	68	1 35			2 at 1 7 " 2 1 " 3 3 " 4 0 " 5 1 " 6 1 " 7 1 " 8 1 " 9 13 " 10	2 at 1 2 " 2 1 " 3 1 " 4 1 " 5 2 " 6 2 " 7 2 " 8 10 " 9 10 " 10	27
Mean	30 13	30 07	70.5	73.2	66.6	68.7	75.5	62.4	63					
Min	30 03	29 90	61	67	57	63	63	54						

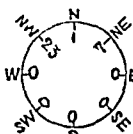
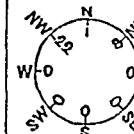
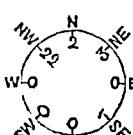
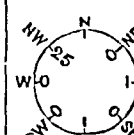
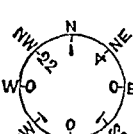
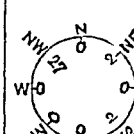
ABSTRACT of METEOROLOGICAL OBSERVATIONS—continued

DATE	BAROMETER		THERMOMETER				SELF REGISTERING THERMOMETER		RAIN IN 24 HOURS	WIND	CLOUDS	No of Days in each Month on which no Run or Snow fell		
			Dry Bulb		Wet Bulb		Max. in Air	Min in Air					Summary of Direction	0—10
	9 30 A M	3 30 P M	9 30 A.M	3 30 P M	9 30 A M	3 30 P M	9 30 A M	9 30 A M		9 30 A.M	3 30 P M		9 30 A M	3 30 P M
1880	Inch	Inch	°	°	°	°	°	°	Inch					
MARCH —														
Max	30 33	30 25	82	82	75	78	83	72				2 at 1 8 , 2 4 , 3 5 , 4 2 , 5 1 , 6 1 , 7 1 , 8 6 , 10	2 at 1 9 , 2 6 , 3 4 , 4 0 , 5 1 , 6 1 , 7 1 , 8 6 , 10	31
Mean	30 17	30 09	72	75	67	70	76	63						
Min	30 05	29 97	60	62	56	59	62	53						
APRIL —														
Max	30 22	30 16	85	83	78	78	85	74	1 08			5 at 1 7 , 2 1 , 3 0 , 4 0 , 5 1 , 6 1 , 7 3 , 9 11 , 10	4 at 1 5 , 2 3 , 3 4 , 4 3 , 5 0 , 6 7 , 7 8 , 8 8 , 10	28
Mean	30 1	30 03	75 04	78 06	70 13	72 40	79 16	67 93	60					
Min	29 89	29 81	66	68	62	64	69	59						
MAY —														
Max	30 11	30 05	87	88	82	83	90	80	5 70			6 at 1 4 , 2 3 , 3 1 , 4 0 , 5 0 , 6 1 , 7 1 , 8 3 , 9 12 , 10	5 at 1 3 , 2 3 , 3 0 , 4 3 , 5 0 , 6 7 , 7 8 , 8 9 , 9 12 , 10	22
Mean	30 00	29 95	81 96	83 54	78 12	79	85 32	76 38	1					
Min	29 92	29 85	75	79	74	75	80	73						
JUNE —														
Max	30 08	30 03	89	87	84	83	89	80	2 60			6 at 1 0 , 2 5 , 3 1 , 4 3 , 5 1 , 6 3 , 7 1 , 8 5 , 9 3 , 10	0 at 1 1 , 2 1 , 3 1 , 4 5 , 5 0 , 6 6 , 7 4 , 8 5 , 9 11 , 10	8
Mean	29 96	29 92	84 70	84 46	80 70	80 96	86 70	77 80	84					
Min	29 87	29 84	82	78	79	77	83	75						
JULY —														
Max	30 05	29 99	88	88	84	87	90	81	9 63			7 at 1 3 , 2 4 , 3 1 , 4 2 , 5 2 , 6 2 , 7 2 , 8 3 , 9 5 , 10	0 at 1 2 , 2 2 , 3 4 , 4 1 , 5 1 , 6 1 , 7 4 , 8 7 , 9 9 , 10	17
Mean	29 88	29 84	85	86	81	82	88	79	75					
Min	29 76	29 70	79	83	77	78	83	75						

ABSTRACT of METEOROLOGICAL OBSERVATIONS—continued

DATE	BAROMETER		THERMOMETER				SELF REGISTERING THERMOMETER		RAIN IN 24 HOURS	WIND		CLOUDS		No of Days in each Month on which no Rain or Snow fell.
			Dry Bulb		Wet Bulb		Max. in Air	Min. in Air		Summary of Direction		0—10		
	9 30 A M	3 30 P M	9 30 A M	3 30 P M	9 30 A M	3 30 P M	9 30 A M	9 30 A M		9 30 A M	3 30 P M	9 30 A M	3 30 P M	
1880	Inch	Inch	°	°	°	°	°	°	Inch					
AUGUST —														
Max	30 14	30 10	90	88	83	83	90	80	6 53			0 at 1	2 at 1	
Mean	29 89	29 86	85	84	80	80	86	77	902			3 , 2	1 , 2	
Min	29 71	29 64	78	79	76	77	81	75				4 , 3	2 , 3	
												5 , 4	3 , 4	
												1 , 6	4 , 6	
												2 , 7	2 , 7	
												3 , 8	2 , 8	
												4 , 9	3 , 9	
												8 , 10	10 , 10	7
SEPTEMBER —														
Max	30 13	30 05	89	88	84	83	90	82	3 48			4 at 1	0 at 1	
Mean	29 92	29 55	86	85	81	81	87	79	2 11			2 , 2	2 , 2	
Min	29 40	29 05	77	80	75	76	81	67				6 , 3	3 , 3	
												2 , 4	5 , 4	
												2 , 5	2 , 5	
												4 , 6	1 , 6	
												2 , 7	2 , 7	
												1 , 8	4 , 8	
												1 , 9	2 , 9	
												6 , 10	9 , 10	21
OCTOBER —														
Max	30 14	30 07	88	86	84	81	89	79	28			4 at 1	3 at 1	
Mean	30 07	29 96	82	82	78	77	84	74	4			5 , 2	1 , 2	
Min	29 76	29 75	72	71	70	69	75	68				3 , 3	5 , 3	
												0 , 4	1 , 4	
												0 , 5	0 , 5	
												0 , 6	3 , 6	
												4 , 7	3 , 7	
												1 , 8	1 , 8	
												2 , 9	2 , 9	
												12 , 10	12 , 10	26
NOVEMBER —														
Max	30 32	30 24	82	79	76	74	82	69				7 at 1	2 at 1	
Mean	30 21	30 13	76	76	69	68	78	64				9 , 2	5 , 2	
Min	30 12	30 05	70	69	61	64	71	55				4 , 3	6 , 3	
												3 , 4	1 , 4	
												2 , 5	4 , 5	
												1 , 6	4 , 6	
												0 , 7	2 , 7	
												2 , 8	1 , 8	
												0 , 9	0 , 9	
												2 , 10	5 , 10	30
DECEMBER —														
Max	30 38	30 29	79	76	74	71	79	68	70			5 at 1	3 at 1	
Mean	30 20	30 18	68	70	63	74	72	59	44			7 , 2	2 , 2	
Min	30 07	30 08	57	61	53	56	63	50				2 , 3	5 , 3	
												0 , 4	3 , 4	
												1 , 5	2 , 5	
												1 , 6	0 , 6	
												2 , 7	0 , 7	
												3 , 8	2 , 8	
												3 , 9	3 , 9	
												7 , 10	11 , 10	26

ABSTRACT of METEOROLOGICAL OBSERVATIONS—*continued*

DATE	BAROMETER		THERMOMETER				SELF REGISTERING THERMOMETER		RAIN IN 24 HOURS	WIND		CLOUDS		No of Days in each Month on which no Rain or Snow fell
			Dry Bulb		Wet Bulb		Max in Air	Min in Air		Summary of Direction		0—10		
	9 30 A M	3 30 P M	9 30 A M	3 30 P M	9 30 A M	3 30 P M	9 30 A M	9 30 A M		9 30 A M	3 30 P M	9 30 A M	3 30 P M	
1881	<i>Inch</i>	<i>Inch</i>	°	°	°	°	°	°	<i>Inch</i>					
JANUARY —														
Max	30 37	30 30	70	71	66	67	73	65				5 at 1	1 at 1	31
Mean	30 24	30 16	66	68	59	61	70	57				5 , 2	0 , 2	
Min	30 06	30 01	59	61	52	53	64	52				7 , 3	9 , 3	
												2 , 4	5 , 4	
												3 , 5	4 , 5	
												2 , 6	2 , 6	
												1 , 7	1 , 7	
												2 , 8	1 , 8	
												3 , 9	3 , 9	
												1 , 10	5 , 10	
FEBRUARY —														
Max	30 36	30 26	78	83	74	78	84	74	05			0 at 1	2 at 1	27
Mean	30 21	30 12	72	76	67	69	76	65				9 , 2	3 , 2	
Min	30 08	30 01	66	69	61	64	70	59				3 , 3	4 , 3	
												6 , 4	7 , 4	
												4 , 5	5 , 5	
												3 , 6	2 , 6	
												0 , 7	2 , 7	
												2 , 8	2 , 8	
												0 , 9	0 , 9	
												1 , 10	1 , 10	
MARCH —														
Max	30 35	30 28	79	81	75	76	82	70				5 at 1	0 at 1	31
Mean	30 23	30 14	69	74	65	68	75	63				4 , 2	2 , 2	
Min	30 10	30 02	56	58	53	53	58	52				4 , 3	6 , 3	
												2 , 4	2 , 4	
												4 , 5	1 , 5	
												1 , 6	2 , 6	
												0 , 7	3 , 7	
												0 , 8	2 , 8	
												2 , 9	6 , 9	
												9 , 10	7 , 10	

H—DR FLEMMING CARROW'S Report on the Health of Canton for the Half-year ended 31st March 1881

DURING the last six months we have been visited by an epidemic of small-pox not only in Canton, but in the districts north and west of the provincial city. From the most reliable information I can get, I learn that this disease has raged to an unprecedented extent. In the streets of the native city, in the open squares before the temples, and in the boats on the river, as well as in the houses, one may see numbers of faces covered with eruption. Indeed, it has been so prevalent that it has kept many visitors away during the winter.

Foreigners have not escaped, although nearly every resident has adopted the precaution of vaccination. We have had five cases among the Europeans, no deaths occurred, and, in fact, although the disease has been so prevalent, it has assumed an exceedingly mild form.

I have to report a case of acute pneumonitis which ran its course to a speedy and fatal termination.

Patient, æt 31, was in perfect health on 30th December, following day contracted a cold, and on 1st January took to bed, with severe rigors, followed by high fever. Temperature, 102°, pulse, 120, respiration, 40. High febrile symptoms continued, and the progress of the disease in the lungs was rapid. At the end of eight days temperature and pulse diminished, but the respiration increased in frequency until it rose to 60, where it remained till death. The rusty sputa and the significant râles, with the other symptoms I have mentioned, made the diagnosis easy. Death occurred on the 17th day.

The following case was diagnosed as a complication of typhus and variola hæmorrhagica. It was altogether the most interesting one I ever had, and I believe it to have been an example of a rare form of disease. I was therefore fortunate in obtaining a postmortem, for and at which, as well as through the course of the case, I desire to express gratitude to DR CLOUTH of Hongkong.

J B, æt 29, strong and well nourished, in perfect health, had been feeling, as he termed it, "feverish" for two days. Had taken a long walk on a bright, warm day, and supposed his indisposition to result from this exposure to the sun.

3rd Day—His symptoms increased in severity, and he sent for me. I found him suffering from a severe headache, high fever, a peculiar tingling of the skin, tongue thickly coated. Bladder had not been relieved for 20 hours, but felt no inconvenience from it, and no desire to empty it.

4th Day—Said he had urinated since my last visit, but the servants had not kept it for my inspection, told me the urine was very scanty and like blood. (This last fact was very interesting after the disease had developed itself further.) Faeces black, cough, with rusty expectoration, marked dulness over the right lung, respirations very fast, 56 per minute, temperature about normal, and I may say it was natural through the whole course of the disease. Over the breast I noticed a few small ecchymotic spots. Ordered potassium bromide. No sleep.

5th Day—Body and extremities thickly covered with ecchymotic spots, conjunctivæ injected, and the vessels engorged with blood, mucous membrane within the mouth and the tongue thickly studded with these black spots. Evacuated the bladder and found urine like blood. Face was swollen and of a leaden hue. No sleep. Very evident that death was soon to follow.

6th Day—Face almost black. No sleep during the night just passed. Full command of the mental powers to the last. Death occurred in the evening.

Treatment throughout had reference to symptoms only, as it was evident from the first that we could not save life

At the *postmortem* the entire mucous tract was found thickly studded with the same ecchymotic spots which we noticed on the skin, with here and there along the intestine small ulcers situated in the centre of these spots, in many places they had nearly perforated the bowel. A very noticeable ulcer, which had quite perforated, was found at the ileo caecal valve. In the liver, spleen, kidneys, heart and lungs were found these same spots, some of them as large as a shilling. The pericardium contained a large quantity of bloody serum. The stomach and bladder also held a considerable quantity of black fluid, that in the bladder was solid. In the right lung we found that condition which gave us the dull sound on percussion before death, it was greatly congested. We were requested not to open the cranium.

These two deaths are the first which have occurred at this port in two and a half years, and, upon the whole, we have had very little sickness, notwithstanding the fact that throughout China our climate is considered very unhealthy. I can bear Dr MANSON out in stating that we meet with varieties of fever in South China which have not been described, and which do not fall under any classification heretofore made, especially is this so in this province. "Fever which yield to quinine, and fevers over which it has no influence" seems to be a classification, although unsatisfactory, which one has to adopt in the treatment of these cases. At the present time I am treating two cases with quinine, and have had them under observation for two weeks, during which time I have kept up the symptoms of cinchonism, and thus far have noticed no improvement whatever. In a recent case I gave up the quinine treatment, and a cure was speedily effected spontaneously.

In February a death occurred from cirrhosis of the liver. The patient, a tidewater, was ordered to Hongkong, with the idea that this change might produce a favourable result, or at least prolong the life of the man, but death soon resulted.

During the autumn we were not visited by our usual epidemic dengue. Intermittent fever, measles, rheumatic affections and ophthalmia have been the diseases presented for treatment.

For the following meteorological table I am indebted to the Assistant Tidesurveyor, Mr IFFLAND —

MONTH	WINDS							WEATHER			BAROMETER				THERMOMETER			
	No of Days N to E	No of Days E to S	No of Days S to W	No of Days W to N	No of Days Variable	No of Days Calm	Average Hourly Force	No of Days Fog	No of Days Rain	Rainfall in Inches	DAY		NIGHT		DAY		NIGHT	
											Highest Reading and Average Highest	Lowest Reading and Average Lowest	Highest Reading and Average Highest	Lowest Reading and Average Lowest	Highest Reading and Average Highest	Lowest Reading and Average Lowest	Highest Reading and Average Highest	Lowest Reading and Average Lowest
											Inches	Inches	Inches	Inches	°	°	°	°
1881							miles											
January	21	1	7	1	1		4.4				{ 30 35 30 24	{ 30 05 30 16	{ 30 30 30 20	{ 30 05 30 18	75 69	47 57	69 62	42 56
February	14	7	1	1	5		6.6		17	1.3	{ 30 30 30 16	{ 29 91 30 06	{ 30 37 30 11	{ 29 93 30 07	79 69	52 62	74 65	55 61
March	21	2	2	6			6.8	3	11	5	{ 30 33 30 20	{ 29 90 30 12	{ 30 30 30 17	{ 29 93 30 13	78 63	42 56	74 59	42 53

I—Dr E A ALDRIDGE's Report on the Health of Hoihow for the Half-year ended 31st March 1881

HOIHOW is situated on the north coast of the island of Hainan, in latitude $20^{\circ} 3' 13''$ N, longitude $110^{\circ} 19' 3''$ E, and is the seaport of the city of Krungchow, which was opened for foreign trade in 1876, and is situated about 3 miles inland from Hoihow. The width of the Hainan Straits between Hoihow and the mainland—the Leinchew peninsula—is about 12 miles. The town of Hoihow is built on the south bank of one of the mouths of the principal river in the island that commonly goes by the name of the Tingan River, the houses reaching to within a short distance of the entrance of the river into the straits. At high water, opposite the town the water is over 200 yards wide, but it is not one-third that width and very shallow at low water. The native population is estimated at about 12,000, while there are now 11 foreign residents.

From a sanitary point I consider that Hoihow does not compare unfavourably with other Chinese towns. The greater proportion of the inhabitants reside inside the walls of the town, but even there there is plenty of room for good ventilation, for the houses are not very thickly built together, and there are many large open spaces still unbuilt upon. The streets are well paved and drained. There is one large drain running through the town, from which there are numerous branches running up the different streets. The drainage runs into the river, and the householders subscribe so much yearly to keep the drains in repair. As a general rule, nothing but dirty water is emptied into them, all other refuse being kept in covered boxes, and collected every morning by the scavengers, by whom it is taken into the country and used for manuring the soil.

The people in Hoihow are mostly very poor, but as provisions are plentiful and cheap, they are able to live on a very small amount. Beef has been for sale in very large quantities. The meat of cows that have died of the cattle disease now raging on the island has been sold and largely eaten by the Chinese, without causing, as far as I can understand, any injurious effects. Most of the meat sold, however, has been from cows that have been slaughtered by the farmers soon after they have become affected by the disease. The foreign residents here have for a long time left off eating beef. The cattle are bred entirely for agricultural purposes, and we are hence unable to obtain cow's milk. Goat's meat can always be had, but as there are no sheep on the island, the want of mutton is very much felt. There is a certain prejudice among the foreign residents against the pork sold here. The supply of sucking pigs is large, and they are in considerable demand. There is always an abundant supply of fish, poultry and vegetables to be had in the market. The varieties of fish of good quality are numerous.

Since the port was opened, 16 foreigners have been resident for different periods of time, and I am given to understand from those that lived in Hoihow when they did, and still reside here, that none of them suffered from any sickness at all serious, and in not one instance did any of them have to leave the port on account of ill-health, but most of them, being in government employ, were transferred to other ports. Before I arrived here, seven

months ago, there was no medical man nearer than Hongkong, which is distant 270 miles, and though I have made numerous inquiries, I can only hear of one instance in which anyone has had to apply personally for medical advice. This man was then suffering from stomacic and biliary derangement, with which he was troubled after suffering from cholera in a more northern port, he has gained in weight since he arrived, and is now in good health. Another applied by letter for medical advice, as he was then suffering from eczema of the feet, and asthma, he was first troubled with asthma when in the north of China, and it is probable that there is a strong predisposing cause, as his mother has been for some years troubled with the same complaint, hence the cause cannot altogether be said to be climatic. If anything further than the even temperature of the place was required to show that residence in Hoihow was not unsuitable for anyone liable to chest affections, I may state that one man here now came to Hoihow on account of his suffering severely from asthma and bronchitis, since which time he has not had a single attack, and has gained 27 pounds in weight. Another man, now here three years, suffered from the same complaints for a long time before he arrived here, since which time he has not been for a day off duty on account of sickness. The only complaints for which I have been consulted that have not been of a trivial character have been asthma, which I have already mentioned, and synovial rheumatism, occurring in a man whose employment is mostly out of doors. This man came here five years ago, when he was suffering from chronic diarrhoea, for which he was taking large doses of opium, and he tells me that the change of residence was so beneficial that he was soon all right, and has not been troubled with diarrhoea since.

The average length of time that the foreigners here now have resided in China is a little over $11\frac{1}{2}$ years, and their experience so far has been such as to make them believe that this is one of the healthiest ports in China.

The water obtained from the wells in Hoihow is blackish and not fit for drinking, but very good water can be obtained from the springs a few minutes' walk from the town. The supply of water from these springs has not been the least affected by the very dry season we have lately had here. On the 17th and 18th October last we experienced heavy rain and squally weather, while off the north-east coast of the island there was a typhoon raging, during which three sailing vessels were wrecked, and out of a crew of 42 on one of the vessels, only 9 were saved. The survivors arrived in Hoihow a few days afterwards, worn out with fatigue and exposure. I had several of them under my hands for diarrhoea, cut, blistered, and cedematous feet, the result of the trials and privations they had undergone, the natives of the districts through which they had to walk in many cases tying to rob them even of the clothing they had on.

A large number of the poorer classes have applied to me for relief, and they have no hesitation in taking foreign medicine. As in the other ports of China, diseases of the eye and skin predominate. I have to thank the Chinese merchants for subscribing the money to purchase the drugs I have used. A large amount of leprosy exists in the neighbourhood. The lepers are frequently to be seen along the sides of the principal streets exhibiting their sores and soliciting charity, more pitiful-looking objects it is difficult to imagine, their clothing in many cases consisting of nothing but coarse matting tied together by string, while they let their long, black, uncut hair hang over their faces. The huts of the lepers are clustered

together by themselves, and thus form a small village. Since my arrival here I have not seen a single infectious case. Small-pox is very much dreaded. Five years ago there occurred an epidemic, during which 600 or 700 lives are said to have been lost in Hoihow and the neighbourhood. The Chinese here have great faith in vaccination, and seem determined, should small-pox visit these parts again, that the ravages of the disease shall be lessened. At the end of 1877 the officials invited a Chinese vaccinator in Hongkong to come here, which he did, and vaccinated 300 persons. During the last months of 1878 and early months of 1879 there were 3,500 vaccinated, 1,200 were vaccinated during the same periods of 1879 and 1880, while since last October no less than 4,000 children and adults have been vaccinated by one man, who comes from the Tung'hwa Hospital in Hongkong. The present operator introduces lymph into four punctures on each arm, which the parents willingly allow, and bring their children for many miles to have them vaccinated. The vaccinator lays down an unnecessary dietary *régime* to be followed. These rules he has had printed, and he orders that for three weeks after vaccination only certain kinds of food are to be eaten, meat is forbidden, and everything eaten is to be first boiled.

The explosion of some gunpowder that was being dried over a charcoal fire in an iron pan, resulted in a man and a woman being severely burnt about the face, neck and chest, while another man was also badly burnt on the lower extremities. The persons burnt were according to their religion all vegetarians and teetotallers, and their friends would not let anything be given them to keep up their strength but boiled rice and water. I always upon seeing them dressed the wounds and wrapped the parts burnt in cotton wool, but upon my return I used to find my dressings removed and fermented rice and cabbage leaves applied in their place. Death resulted in all the cases. An infant that was lying in the same room in which the accident occurred also died, though I cannot believe that its death was caused by the explosion. The mother of the child had poisoned herself with opium shortly before the accident, on account, I was told, of leprosy having shown itself upon her, and hence, I believe, the relatives neglected the child rather than keep it alive. I have had one case of opium-poisoning under my care in a boy, aged 15 years, who, to save himself from a thrashing that he expected, pawned his coat, and with the money thus obtained bought some prepared opium, and was shortly afterwards found lying in the streets under its influence. I was immediately sent for, and, after using the usual remedies, was able to bring the boy round, and he made a satisfactory recovery.

The majority of the houses here are only one story high, but the Europeans, though having to content themselves with Chinese architecture, have been able to obtain two-storied dwellings. They are built close to the water's edge, upon a sandy soil, but though within such close proximity of the water, they have only once been flooded in the last five years, this occurred last September, the water in the river rising 10 feet,—the highest, the inhabitants say, during the last seven years. Residence in these houses has so far not proved injurious, yet were not other buildings so close to some of them, they would be more enjoyable places of residence. Within 10 minutes' walk of the town of Hoihow the ground rises considerably, on which ground there is a site admirably situated for European dwellings, the elevation would ensure that houses built there would be free from damp and that the sea breeze would be felt. The fresh-

water springs are close by, and though quite away from the town, the distance from business is so slight that little inconvenience would be felt. Judging this situation from a picturesque point, there is an extensive view on all sides, looking towards the north, the view extends over the harbour and Straits of Hainan. The surroundings of the ground I refer to are good, as it adjoins the very pretty village of Tyingshan, which, on account of its thick woods intersected by paths, is the frequent resort of the foreign residents. Should any of the Europeans here build houses for themselves, I think they would find the situation I mention the most suitable.

My experience, after the seven months I have resided here, is that Hoihow is not such an undesirable place of residence as might be imagined. We have had fine, clear weather, the temperature being neither unpleasantly hot or cold, and I believe a more agreeable climate than that which I have so far experienced is impossible to be found in any part of the world. Hoihow presents numerous facilities for out-door exercise. There are fairly good opportunities for sea-bathing and boating. Within 10 minutes' walk of the town there is wild pigeon and golden plover shooting, and for six months in the year plenty of snipe can be bagged. Within seven miles, jungle fowl, deer and wild duck can be obtained. There are also to be had here strong, sturdy ponies for those who care about that exercise.

The farmers must have had a bad time of it lately on account of the epizootic among cattle, which not only has injured the owners, but also the sugar planters, who, owing to the scarcity of cattle, have been unable to get the cane crushed, and a large quantity has thus been lost. The dryness of the late season has also done a good deal of injury to the rice and other crops. Disease appeared first among the cattle at Hainan, which is situated on the mainland, and the farmers there, finding that the supply of beef for the markets was in excess of the demand, shipped some of the cows to Hoihow as soon as they became sick. The disease showed itself round Hoihow in the early part of 1880, from which place it soon spread into the interior of the island, at the end of the year it was thought that it had died out, but during the dry weather we experienced in January and February of this year it again appeared. I cannot hear that the water buffaloes have been affected in this neighbourhood, though it is said that they have suffered in the interior. Some idea of the large number of cows that have died, in excess of those that were killed or died a natural death in 1879, may be imagined when I mention that five times as many hides were exported in 1880. I am told that the dry season has greatly increased the mortality amongst the cows and their liability to catch the disease, and I believe this opinion to be correct. I have examined several diseased cows both before and after death, and have noticed that the disease lasted from 3 to 12 days, the average length of time being 5 days, death usually occurring on that day, recovery being rare. The first symptom shown was loss of appetite, the animal affected refusing all food, this symptom was carefully noticed by the owners as being the first warning of the disease. There was great thirst and diarrhoea, no vomiting, tongue covered with a brown fur, the skin cold and bathed in perspiration, and the animal rapidly lost flesh, it did not seem in pain, and appeared to die from exhaustion, the result principally of the diarrhoea. Upon making a postmortem I noticed that decomposition was very rapid, the bowels were empty and rapidly became black. I examined the mucous membrane, but did not find any ulceration, though the mucous lining was easily stripped off from the

other coats, Peyer's patches were very prominent, and the mesenteric glands enlarged. The liver was enlarged, and the gall bladder distended with bile, and when separated from the liver weighed 20 ounces. After letting out the bile it measured in length 8 inches. The butchers are so struck by this prominent sign that the disease goes by the name amongst some of them of the "dābne" or "gall-bladder disease." All the other organs of the body appeared healthy. Some of the cows were also during life troubled with the running of mucus from the nostrils, and in two cases that I examined after death, the upper lobes of the lungs were congested, and at their apices the tissue was soft and friable. The disease I believe to be underpest, complicated in some cases by pneumonia.

During the six months under review the weather has been very agreeable, the average temperature by day during the whole period, including October, which was a hot month, has been about 68° F. In February we had some very warm weather, the thermometer rising on one day to 87°, on this day there occurred a squall from the south-east, accompanied by a fall of very large hailstones. We experienced the coolest weather in March, when the lowest reading was 52°. We have had the driest season since the port was opened. The average number of days on which rain fell from March to October of previous years has been 40, while during the last six months we have only had rain on 22, from 19th October to 3rd December, or for 45 days, and from 2nd January to 4th February, or for 33 days, we were without rain. We have only had fog on 8 days. The wind during almost the whole time has been north-east, in February, however, for half the month the wind was more southerly, though the force of the wind has only on one or two occasions been very strong, we have had not a single calm day. The tides at this port are very irregular, we have had but one freshet, which occurred after heavy rain in October.

For the greater part of the material from which I have drawn up the following meteorological table, I am indebted to Mr POYNTER, the Hoihow Harbour Master —

YEAR AND MONTH	WINDS						BAROMETER		THERMOMETER		Number of Days Fog	Number of Days Run	AVERAGE RISE AND FALL OF TIDES		
	No of Days N to E	No of Days E to S	No of Days E to W	No of Days W to N	No of Days Variable	No of Days Calm	Average Hourly Force	Highest and Average Highest	Lowest and Average Lowest	Highest and Average Highest			Lowest and Average Lowest	Highest	Lowest
1880								<i>Inch</i>	<i>Inch</i>	°	°			<i>Ft in</i>	<i>Ft in</i>
October	27			4			3	30 13 30 06	29 90 30 01	80 84	75 80		6	6 0	5 0
November	30						2	30 36 30 23	30 10 30 19	80 78	66 73			5 6	5 0
December	30	1					4	30 41 30 25	30 08 30 20	75 69	56 63	4	9	5 0	4 6
1881															
January	31						3	30 35 30 25	30 08 30 20	73 69	56 63		1	3 6	3 0
February	14	10	1	1	2		3	30 32 30 13	29 89 30 08	87 77	65 72	1	2	4 0	3 6
March	25	4			2		4	30 35 30 17	29 92 30 14	81 70	52 64	3	4	4 6	4 0

K—D¹ ALEXANDER JAMILSON'S Report on the Health of Shanghai for the
Half-year ended 31st March 1881

ABSTRACT of METEOROLOGICAL OBSERVATIONS taken at the Observatory of the Jesuit Mission
at Sicawei, for the Six Months ended 31st March 1881 Latitude, $31^{\circ} 12' 30''$ N
Longitude E of Greenwich, $8^{\text{h}} 5^{\text{m}} 44.63^{\text{s}}$

DATE	Baro- meter at 32° F	THERMOMETER		Elastic Force of Vapour esti- mated in Inches of Mer- cury	Hu- midity, 0-100	Ozone, 0-21	Velocity of Wind per Hour	Mean Direction of Wind.	Total Evapor- ation during Month	Total Rainfall during Month	REMARKS
		Durnal Mean Temperature in Shade	Extreme Temperature in Shade								
1880	Inch	$^{\circ}$ F	$^{\circ}$ F	Inch			Miles		Inch	Inch	
Oct	Max	30 370	81 5	0 701	99	13	18 5	N 40° E	2 67	1 99	Six days rain On the 11th the fall was 1 04 inches
	Mean	30 110	62 2	0 488	78	9	5 5				
	Min	29 898	42 8	0 189	36	5	0 6				
	Range	0 472	38 7	0 512	63						
Nov	Max	30 527	73 9	0 476	98	14	26 2	N 47° W	2 87	0 34	Three days rain First frost on the morning of the 8th First snow at 2 20 P M on the 28th
	Mean	30 270	47 5	0 233	68	9	6 6				
	Min	29 945	21 0	0 071	22	0	0 0				
	Range	0 582	52 9	0 405	76						
Dec	Max	30 788	63 5	0 311	100	16	24 5	N 15° W	2 19	0 70	Seven days rain On the 29th the humidity was 100 in the morning, and 18 in the afternoon During nine days the mean reading of the ther- mometer was below freezing point
	Mean	30 428	38 7	0 165	70	9	7 9				
	Min	30 137	14 0	0 039	18	0	0 6				
	Range	0 651	49 5	0 272	82						
1881											
Jan	Max	30 561	60 3	0 319	100	15	34 8	N 51° W	3 01	0 03	Two days showers Several dust storms
	Mean	30 279	39 4	0 138	64	10	8 9				
	Min	29 961	18 5	0 032	14	5	0 6				
	Range	0 600	41 8	0 287	86						
Feb	Max	30 681	77 2	0 547	100	21	21 1	N 48° E	1 77	2 11	Eleven days rain On the 23rd the heat was like that of summer, but was followed by a storm and sharp cold on the 24th
	Mean	30 224	50 9	0 232	79	12	8 8				
	Min	29 725	24 6	0 071	30	7	0 0				
	Range	0 956	52 6	0 476	70						
March	Max	30 575	65 3	0 374	96	21	25 1	N 26° E	2 16	5 52	Fifteen days rain Rain fell on each of the first 13 days of the month The last fall of snow for the season occurred on the 8th
	Mean	30 317	47 9	0 204	75	12	9 8				
	Min	29 999	30 6	0 094	35	7	0 9				
	Range		34 7		61						

For the above abstract of observations I am as usual indebted to the Rev Father
DECHEVRENS, S J, Director of the Sicawei Observatory

BURIAL RETURN of FOREIGNERS for the Half-year ended 31st March 1881 *

CAUSE OF DEATH	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	TOTAL
Small pox					1†		1
Typhus fever					2†	1†‡	3
Typhoid fever	1†	1		1§			3
Alcoholism			1				1
Septicæmia	1						1
Gout		2					2
Bright's disease		1					1
Dysentery	f 1†		1		1	1	4
Cancer (of œsophagus)	1						1
General tuberculosis			1¶				1
Phthisis	1		1¶¶	f 1	f 1		4
Pneumonia						1†‡	1
Disease of the heart	1**	1		1†			3
Aneurism of aorta	1†¶						1
Abscess (multiple) of liver	1		1				2
Cirrhosis of liver	f 1	1					2
" " and kidneys				1 •			1
Peritonitis					1†¶	f 1	2
Trismus neonatorum	f 1††‡‡						1
Tumour of brain		1					1
Convulsions				f 1††§§			1
Hemiplegia						1¶	1
Still born					f 1††		1
Frozen to death				2†			2
Drowned	2	2†					4
Suicide		1 f 1¶					2
Uncertified	1¶						1
TOTAL	13	11	5	7	7	5	48

* Not including deaths among the Catholic religious bodies

† Not resident (14)

‡ Lascar (2)

§ 8 years old

¶ 11 years old

¶¶ Native of Manila (6)

** 10 years old

†† Miao (3)

‡‡ 6 days old

§§ 2 years old

Clearing away 1 still-born, 2 suicides and 6 deaths from accidental causes, 39 deaths remain attributable to disease. Of these, 2 were due to specially infantile maladies, and of the 37 remaining (among which I include 3 deaths at the ages of 8, 10, and 11 years respectively, resulting from typhoid fever, disease of the heart, and general tuberculosis), 10 occurred among non-residents. The mortality among foreign residents past the age of early childhood was thus 27—23 males and 4 females,—as against 14 males and 3 females during the same period of 1879-80.

As, however, it is important to bear in mind the consideration of race when weighing such statistics as are here furnished, the information derived from the following tables is more valuable than any that could be drawn from a study of the general return —

CAUSES OF DEATH FROM DISEASE among RESIDENT EUROPEAN ADULTS, October 1880 to March 1881

Typhoid fever	2	Phthisis	3 (2 females)
Alcoholism	1	Disease of heart	2
Septicæmia	1	Abscess of liver	2
Gout	2	Cirrhosis of liver	2 (1 female)
Bright's disease	1	" " and kidney	1
Dysentery	3	Peritonitis	1 (female)
Cancer	1	Tumour of brain	1
General tuberculosis	1		

20 males and 4 females

CAUSES of DEATH from DISEASE among NON-RESIDENT EUROPEAN ADULTS, October 1880 to March 1881

Small pox	1	Dysentery	1 (female)
Typhus	2	Disease of heart	1
Typhoid	1		

5 males and 1 female

CAUSES of DEATH from DISEASE among the CHILDREN of RESIDENT and NON-RESIDENT EUROPEANS,
October 1880 to March 1881

There were 3 deaths between the ages of 8 and 11 years among the children of residents, but inasmuch as none of these were due to diseases peculiar to children, they have been included among the deaths of adults

CAUSES of DEATH from DISEASE among NON-EUROPEAN ADULT FOREIGNERS, October 1880 to
March 1881

<i>Typhus fever</i>	1 (native of India)	<i>Peritonitis</i>	1 (native of Manila)
<i>Pneumonia</i>	1 (" ")	<i>Hemiplegia</i>	1 (" ")
<i>Phthisis</i>	1 (" Manila)	<i>Uncertified</i>	1 (" ")
<i>Aneurysm of aorta</i>	1 (" ")		

7 males, of whom 4 (indicated by italics) were non-resident

CAUSES of DEATH from DISEASE among the CHILDREN of NON-EUROPEAN FOREIGNERS,
October 1880 to March 1881

<i>Tetanus neonatorum</i>	1 female (parents natives of Macao)
<i>Convulsions</i>	1 " (" " ")

2 females

The latter half of October was dry and windy, and somewhat colder than usual. The lowest temperature registered was 42° 8, at 6 A.M. on the 26th, while the mean of hourly observations on the 31st, which was the coldest day of the month, was 54°. The highest mean of hourly observations, observed on the 1st, was 73° 31. November and December were dry, clear and cold, and, as will be observed by reference to the remarks appended to the table on page 78, the mean daily temperature during nine days of the latter month was below 32°. The average temperature during December was 37° 76. The latter half of January and all February were, with the exception of three days in February, cold and tempestuous. During these three days (21-23), however, it might have been thought that spring had already arrived. On the 21st the thermometer indicated 62° 8, on the 22nd, 70° 7, and on the 23rd, 78° 25. On the morning of the 24th the scene changed rapidly. A violent thunderstorm with heavy rain burst over the settlement, bringing the temperature down to 37° 5, a fall of 40° within 14 hours. March was wet, windy and cold until within the last week, when the daily maximum temperature oscillated slightly about 60°.

Local conditions are not favourable to the institution of parallel series of observations bearing on meteorological phenomena and the contemporaneous presence or absence of particular forms of disease. Such observations would be interesting, but could hardly be of much value at present, considering the limited field open to foreign practitioners in China. It is impossible to obtain from the most intelligent native any but the vaguest and often completely contradictory accounts of reigning maladies, while foreign practitioners have not the leisure

necessary for the prosecution of inquiries in person. Valuable aid in this direction might be obtained from the missionaries, both Catholic and Protestant, who, living among the people or being brought frequently into contact with them, and moreover enjoying their confidence, have opportunities for seeing and hearing which are denied to other foreigners.

With regard to Europeans there is nothing to learn from a reference of the bills of mortality to the months which produced them. Deaths from the specific fevers and dysentery, from diseases of the lungs and heart, are impartially spread over months wherein the temperature was mild and the air laden with moisture, and months wherein the temperature was low, the air dry, and bitter winds defied all means of protection. In fact, the numbers dealt with are too small to possess any value. Here, too, the absence of the aged and of the class which in Western countries is specially obnoxious to vicissitudes of season renders it impossible to gain any useful end by attempting to reduce observations made among foreigners to the scales adopted in other parts of the world, where the conditions of existence are in no respect similar to those which prevail here.

Fifteen years ago some of the older practitioners denied positively that typhoid fever was ever seen among foreigners in China. More accurate diagnosis now refers a large number of cases to typhoid which at an earlier date would have been classed somewhere under the heading of malarious affections. For my own part, after the collation of a very considerable number of cases extending over 13 years, and in which all the phenomena accessible to direct observation are recorded, I have come to believe firmly that the remitting fever which lasts more than a week and does not yield to antiperiodics is typhoid. Some cases of remitting fever which before being seen have been treated fruitlessly with quinine yield when the drug is interrupted and its administration resumed after the action of an emetic or of a smart purge, or when it is combined with salines or with arsenic, or occasionally when, instead of giving it by the mouth it is given as an enema. But when it is clear that antiperiodics are of no benefit, they are, I believe, hurtful, and the sooner they are abandoned the better. In these cases we have, I do not doubt, to deal with typhoid, although there may be neither delirium nor diarrhoea nor eruption, nor tenderness in the ileo-cæcal region*. There is, however,

* Plusieurs malades n'éprouverent, pendant un certain espace de temps, qu'un simple mouvement fébrile, une chaleur forte, une soif vive, peu de somnolence, quelques étourdissements, une perte incomplète d'appétit, un affaissement médiocre, sans douleurs de ventre, sans diarrhée, sans aucun symptôme qui indiquât d'une manière sûre le siège de l'affection. Quelques uns même n'eurent de dévoiement à aucune époque.—LOUIS, *Recherches sur la Fièvre typhoïde*, 1 423 (2me éd. Paris, 1841). Le diagnostic de la maladie fut incertain, son siège indéterminé, pendant un espace de temps plus ou moins considérable, chez quelques sujets, et la prédominance de certains symptômes altérait plus ou moins le caractère habituel de l'affection, chez d'autres.—*Ib.*, 1 426. Les symptômes les plus importants manquent quelquefois.—*Ib.*, 1 186. L'altération des plaques de Peyer n'est pas toujours également grave, et il n'y a pas toujours proportion entre elle et la gravité des symptômes.—*Ib.*, 1 513.

Les taches rosées manquent assez souvent, sur 70 cas de fièvre typhoïde, CHOMEL n'avait pu 16 fois en trouver aucune trace à aucune époque de la maladie. Nous ne voyons plus les fièvres intermittentes se changer en fièvres putrides (typhoid), mais nous voyons celles-ci prendre en quelques circonstances, à leur début, les allures de celles-là. C'est surtout dans les contrées où les fièvres palustres sont endémiques que nous voyons la dothiéntérie prendre à son début le type intermittent. L'épithète d'intermittente ne saurait donc être réservée pour désigner une seule espèce de fièvre, puisque l'intermittence est un phénomène des plus mobiles qui se retrouve dans les fièvres de nature toute différente.—TROUSSEAU, *Clinique Médicale*, 1 228, 273, 274 (3me éd. Paris, 1868).

No acute disease presents itself under a greater variety of forms than enteric fever. These differences are partly accounted for by constitutional peculiarities in the patient, and partly by differences in the intensity, or perhaps quality,

generally more or less tympanites, and almost invariably a marked depression, for which the actual degree of fever is insufficient to account. In all these cases the time for quinine comes later. During the third week, when the morning temperature may be normal or subnormal, there is commonly a rise to 100° or 101° between 6 P.M. and midnight. One large daily dose of quinine is at this stage invaluable.

An interesting case of typhoid fever occurred in my practice during the month of May. An adult male, aged 28, had during the last 10 days of April passed through an exceptionally severe attack of measles, characterised by high temperature (max 104°), profuse eruption, severe catarrh of all the mucous membranes except that of the urinary tract, and night delirium. He was out of the house for five days when symptoms of typhoid fever declared themselves. There was smart diarrhoea during the latter part of the first week and at the beginning of the second, when three spots were discovered on the abdomen. Epistaxis occurred twice during the first week, and at the same time difficulty and pain on attempting to swallow led to the discovery of a deeply excavated circular ulcer, about $\frac{1}{2}$ inch in diameter, situated on the posterior wall of the pharynx. On the 9th and 10th days there was frequent and abundant hæmorrhage from the bowels, which left the patient in a condition of marked prostration, while distinctly lowering the temperature. During the day (8th) preceding the hæmorrhage, the temperature, taken at intervals of three hours, had varied between 102° and $103^{\circ} 6$. On the second day of the hæmorrhage the temperature fell to 100° , rising on the following day, when the bleeding was definitely arrested, to 103° . On this day the patient was exceedingly deaf in both ears, and this condition lasted through the ensuing week. Four days later the stools (6 in 24 hours) were like meat juice, and horribly offensive. From this out (15th day) improvement was steady. On the 17th day, the temperature having somewhat suddenly fallen from $102^{\circ} 5$ to $99^{\circ} 5$, there was slight delirium, or rather incoherence. The stools were now healthy, and during the third week castor oil had once or twice to be administered. On the 18th day, the morning temperature being $98^{\circ} 6$ and the evening temperature 101° , 10 grains of quinine was administered late in the afternoon, and this dose was continued daily. After the 19th day, which was marked by a profuse perspiration lasting for about three hours, the temperature at no time reached 100° , and was generally subnormal in the morning. On the 27th day the patient was able to go as a convalescent to the country. During his illness he lost 39 lbs in body weight, and subsequently his hair fell in large quantities.

Typhus fever appears for the first time since March 1878 as a cause of death. It will be observed that three patients succumbed to it. All three were non-resident, and the first case, that of a sailor on board H.B.M.S. *Pegasus*, was imported from Chinkiang, or rather from the bank of the river opposite Chinkiang, where typhus had been prevalent for some months, and close to which the *Pegasus* was for a time moored. Whether contagion from this first case accounts for the other seizures I am unable to say. Typhus fever is fortunately rare in Shanghai. During the half-year from April to September 1871, four fatal cases occurred, and five deaths were attributed to it in the corresponding six months of 1872. No case, or at least no fatal case, was then observed until February and March 1878, in each of which months one death from this disease was recorded. The immunity from typhus enjoyed by foreigners

of the poison.

Sometimes the temperature is the only evidence of the existence of fever—MURCHISON, *The Continued Fevers of Great Britain*, pp 586, 587 (2nd ed., 1873).

The unknown author of the Appendix to HIPPOCRATES (*Περὶ διαίτης ὀξέων*) enumerates very minutely and describes very clearly (§ 8) the various symptoms which, separately or combined, characterise typhoid fever. He lays stress on increased heat, diarrhoea, delirium, restlessness, vertigo, headache, epistaxis, and tympanites, but says nothing about hæmorrhages from the bowels or eruption of rose spots on the abdomen. In the *Aphorisms* (27), HIPPOCRATES notes the occasional occurrence of hæmorrhage in the early stages of fever with diarrhoea.

in Shanghai is surprising, and is not likely to be permanent, considering the densely overcrowded condition of the most central portions of the settlements, the want of ventilation, and the almost incredible filth in which thousands of Chinese live within our very midst. Were the post of health officer somewhat less of a sinecure, something might perhaps be done in the way of reform. It would probably be impossible to prevent the dense aggregation of human beings, which is in itself a grave danger,* but a great deal might be effected in the way of enforcing cleanliness by insisting that, among other obvious precautions, the interior of every native tenement should be lime-washed at least once a month. A simple measure of this kind need cost the public nothing, and at all events would be far less expensive than the ludicrous folly of watering the streets with an attenuated solution of carbolic acid. This latter practice, besides being offensive to the nostrils and absolutely useless as a prophylactic against disease, has the further disadvantage, which it shares with all showy and useless measures, of lulling people into a false security. Supervision would not be out of place if exerted over the native common lodging-houses, where at night beggars, vagrants and thieves are packed into sunken and unventilated rooms, in steaming masses sufficient to give origin to any form of disease dependent on filth and overcrowding.

Small-pox, although present throughout the winter half-year, caused but one death. This case was imported from Chinkiang. Dr. BURGE, who can speak with full authority on this subject, informs me that the cases of small-pox which he encounters on board ship are either imported from Japan or contracted by the sailors when visiting the back slums of Shanghai, or in consequence of their contact with the coolies who work cargo. These coolies, coming from the poorest class, necessarily live in the hotbeds of contagious disease ashore. However satisfactory it is to find that vaccination is sought by a certain number of natives in and around Shanghai, our figures are relatively insignificant when compared with those furnished by such a port as Hongkong†. During 1880 there were vaccinated at the Anglo-American Dispensary, 1,472 children, at the French Dispensary, 1,232, and at the Gutzlaff Hospital, 1,481. It is stated in a report published in the *North-China Daily News* (19th March 1881) that "the total number of vaccinations (in connexion with the Shantung Road Hospital) during the year (1880) was 5,414," but no information is given as to whether these were vaccinations performed or vaccinations verified (an objection which might be laid against all the figures given above), or as to whether the vaccinations at the Municipal Dispensary and at the Taotai's City Dispensary are included. It is therefore quite impossible to form any judgment as to the area covered or the success achieved by the praiseworthy attempts made to spread vaccination in the districts surrounding Shanghai. I can speak with confidence only about the results obtained at the Gutzlaff Hospital. There not more than half the children vaccinated are brought back for inspection. Of this half, a number, varying from one-eighth to one-sixth, have not taken at all. Of the remainder, a very considerable ratio have had the vesicles broken by accident or carelessness, or covered with native medicine.

* It appeared from investigations undertaken during the Paris cholera epidemic of 1873 by Dr. JULES WORMS, physician to the préfecture de la Seine, that the prevalence of cholera in the different arrondissements was proportional not to the poverty of the inhabitants, but to the degree of their crowding.

† See ante, page 75.

When abstraction is made of all these, it is obvious that a bare record of vaccinations performed is quite misleading as an indication of the real value of the work done

Dysentery is certainly less fatal, and I think relatively to population less frequent, in Shanghai than it was a few years since. This may probably be ascribed to the gradual rising of the settlements above the level of their earlier days, to their more efficient drainage, to the small number of rice fields in our immediate neighbourhood, and in general to all the influences operating in favour of the extinction of local foci of malaria. The causative connexion of malaria with dysentery is still in doubt, but there can be no question as to the influence of malaria upon dysentery when already present, or as to its importance as a predisposing cause. Greater care on the part of individuals as regards diet, drink and dress has also tended to limit the number of cases, and perhaps to render those which do occur less severe. From 1st April 1878 to 31st March 1881 but 12 fatal cases are recorded. In October 1878 the disease proved fatal to a non-resident female. In the interval between that date and September 1880, the death of but one infant is ascribed to dysentery. During the period now under review four deaths occurred, of which one was the case of a chronic alcoholic, and a second was imported.

The last mentioned was a young married lady who in the middle of October arrived here from another port, dying, gangrene of the bowel having already set in. The motions were scanty but extremely frequent, and consisted solely of blackish-green sloughs of various sizes, and blood clot, with occasionally a smart gush of hæmorrhage. Excessive loss of blood, and probably the treatment adopted, had prevented the appearance of the more acute symptoms of general peritonitis, but the abdomen was distended and tympanitic, and its entire surface so sensitive that it was impossible to discover whether any fluid effusion was or was not present. Thirst was intense, and vomiting incessant, but both were more or less controlled by ice and hydrocyanic acid. The patient lingered for five days after her arrival, during the first two of which a marked and puzzling symptom was furious delirium, with extraordinary hallucinations, lending an indescribable expression of terror to the face, which the natural course of the disease had rendered yellow and pallid. Wide and persistent dilation of the pupils led to minute inquiries into the previous treatment, when it was discovered that through some misapprehension colossal doses of belladonna had been administered. The patient had been taking pills containing $\frac{1}{2}$ grain of opium and $\frac{1}{4}$ grain of sulphate of zinc, with extract of belladonna "qs." Each pill weighed 8 grains. Hence, if nothing but what appeared in the prescription entered into its composition, the dose, which was ordered to be given six times daily, contained $7\frac{1}{2}$ grains of extract of belladonna. The pills had however been, in fact, taken only four times one day and three times the next, and had been omitted on the third day. Thus, always supposing that nothing but the three ingredients above enumerated was contained in the pills, 50 grains of extract of belladonna had been swallowed in two days. It is to be presumed that the extract had suffered from the effects of climate and age. The prescription, it should be remarked, had been made up by a Chinese dispenser.

The body temperature was moderate, never exceeding 100° during the short period of observation, and for 36 hours before death it was subnormal. At this time hiccup was incessant. Death was due to exhaustion and blood-poisoning. There was no postmortem.

The fatal case of septicæmia occurred in a middle-aged man who for several years had suffered from two strictures of the urethra for which he declined surgical treatment.

One stricture, traumatic, the result of a fall straddlewise on a bar, was situated immediately behind the bulb, the other was about an inch in front of the bulb. The former usually admitted a No 6 French

bougie without much difficulty, the latter a No 10. Any impudence, however, quickly narrowed the anterior stricture, so that on two occasions, separated by nearly three years, great difficulty was experienced in getting even a filiform bougie into the bladder. It was not very easy to judge, but it seemed that accidental causes had little or no influence on the posterior stricture. The patient was in the habit of introducing a No 3 English catheter from time to time, and this would occasionally slip into the bladder, but whether it did or not the stream was always better after a slight dilation of the anterior stricture. Early in October he found the stream rapidly diminishing, but it was not until obstruction was complete that he tried to pass an instrument. After many attempts, and doubtless much rough usage, he succeeded in emptying his bladder. This was on the 5th October. Next day he again attempted to pass an instrument, and again succeeded, but after still more protracted attempts, and the stream was preceded by a smart hæmorrhage. In the evening I saw him. Three false passages existed in front of the anterior stricture, one of them, probably that made a few hours before, bleeding slightly on being entered. At length I got a No 5 French olivary catheter into the bladder, and after leaving it for two hours replaced it by a No 8, which I tied in, but during the night he pulled the instrument out, and towards morning (7th) forced a mounted English catheter in various directions through the walls of the urethra. Infiltration had already taken place into the penis and perinæum when I saw him a few hours later, but by an unhopèd-for accident an attempt to reach the bladder with a No 5 French olivary instrument proved immediately successful. Comparatively little urine escaped except by the catheter, though there was constant dripping from the incisions made into the infiltrated tissues. Next day (8th) fever was high, urine mingled with pus, blood clot and sloughs escaped freely from the incisions, but there was evidence of a collection of matter within the pelvis, which a finger passed deeply into the perinæal wound failed to reach. Symptoms of blood-poisoning now declared themselves, and the patient died on the 10th October, on the fifth day after the occurrence of total obstruction.

In Dr PICHON'S Report for 1880, presented to the French Municipal Council, he states —

Les temps humides qui ont pèdominé pendant l'année ont donné aux manifestations de la diathèse goutteuse une intensité et une fréquence inusitées. Douze accès de goutte se sont présentes à mon observation dans le personnel de l'Administration, et l'un de ces accès, qui avait offert dès le début des symptômes de la plus haute gravité, s'est terminé par la mort.

My experience was altogether similar. Several severe attacks occurred in patients who had previously been frequently under observation. Of these, two, one terminating fatally, are worthy of more extended notice.

A foreigner, middle-aged, of temperate habits—who had long suffered from articular gout and various other gouty manifestations, such as obstinate eczema and, on two occasions, pustular eruptions on the extremities, running rapidly into extensive ulcerations undermining the skin—was without obvious cause seized with a violent shivering fit, which continued, with brief intervals of respite, through an entire night. The onset of shivering was accompanied by rather severe bleeding from the nose. I saw him on the fourth day after the beginning of the attack. He was then coughing in severe paroxysms, and expectorating with some difficulty a small quantity of pinkish-yellow mucus mixed with froth. The cough produced intense pain at a point about 2 inches outside the nipple line on the upper border of the sixth rib. There was considerable dyspnoea on any exertion. Swallowing was painful, owing to congestion of the soft palate and pillars, the bowels were regular, the tongue loaded with a yellow fur, except at the tip, the skin retained its natural tint. Appetite was impaired, but not absent. Sleep was interrupted by cough, but there was no delirium. The pulse was 84, respirations, 30, temperature in mouth (8 A.M.), 101°. Percussion and auscultation gave normal results over both backs, except at the lower part of the left lung towards the axillary line, where there was a small patch of dulness with fine crepitation. The left apex from the clavicle to the third rib was dull. Here a souffle, almost cavernous in intensity, was audible, along with fine moist

râles, which were also distinguishable in the axilla. Bronchophony was well marked over both areas of dulness, but was strictly limited. Elsewhere in the lungs nothing abnormal could be detected, and the general condition was far better than would be anticipated in a case of apical pneumonia.

The patient had been rather more than three months without any symptom of gout. Remembering the obstinacy of all his previous multiform ailments so long as specific treatment was withheld, and the rapidity with which they yielded when that treatment was adopted, I ordered iodide of potassium with colchicum after a purgative, while the local treatment was restricted to steam inhalations and a small blister over each of the inflamed areas. Within 24 hours improvement was far too decided to have been the result of chance or of a natural and unaided process of resolution. On the third day the morning temperature had fallen to normal, the paroxysms of cough were less violent and far less frequent, appetite had quite returned, sleep was natural, but there was by no means a corresponding improvement in the physical signs. Two days later the dulness, souffle and bronchophony began to disappear with so much rapidity that the change from the condition at 9 A.M. to that at 4 P.M. was readily appreciable. Simultaneously with this improvement the left great toe became swollen and painful, and a day later all the joints of the left foot were engaged, and a frank attack of ordinary gout ran its customary course, completely replacing the chest mischief.

It seems clear that the lung inflammation in this case was purely gouty, but it is hard to explain why specific treatment should have diminished the intensity of local symptoms without diminishing the force of the attack, which was as violent as usual after its seat was displaced from the lung to the foot. The case is worthy of notice as furnishing an instance in proof of the tendency of diatheses to direct inflammation towards the apices of the lungs. Everybody knows of what evil omen an attack of apical pneumonia is in an old person or in one already tuberculous, how likely it is to run on rapidly to suppuration. In the case just related there never was an alarming symptom. The patient though gouty was otherwise healthy, and therefore, although the existence of gout made the apex a probable seat of inflammation, this seat did not in itself lend any additional danger to the attack. In other words, the ominous character of apical pneumonia in an adult arises not from the position of the inflammation, but from the evidence it affords of a constitution either broken down by age or profoundly affected by a diathesis.

The other case alluded to above turned out badly.

A man, aged about 50, a very free liver, had for many years presented symptoms of gout in all its forms. In the autumn of 1879, after a prolonged period of imprudence in drinking, he suffered from what he at first considered to be mere dyspepsia. In a couple of days there was evidence of severe hepatic congestion, followed by violent headache, and palpitation of the heart so distressing that for several nights he was unable to lie down. The cardiac trouble appeared to be purely functional, no disease could be discovered to account for the tumultuous action. Vomiting was so persistent that neither food nor medicine could be administered by the mouth. These very acute symptoms lasted for three days, but yielded to, or after, a treatment consisting of small blisters to the joints which had previously been the most usual seats of inflammation, mustard baths to the hands, which were always seriously affected in frank attacks of gout, and applications of belladonna to the præcordia. As the visceral symptoms ceased the joints became involved, and an exceptionally severe attack of ordinary articular gout ran its course. Recovery appeared to be complete after three or four weeks, but it was ascertained that a general and undefinable malaise had replaced the sense of vigorous health which the patient had always enjoyed in the intervals between his attacks. All the bodily functions were sluggishly discharged, there was a certain incapacity for exertion, and a distaste for violent and sustained exercise, which had previously been much enjoyed. Appetite flagged, partly perhaps in consequence of abstinence from stimulants, for which there

was for a time no craving. Large quantities of milk were consumed every day, but very little meat. This condition lasted for several months, during which there was no joint attack, while a chronic eczema of the hands which had lasted for several years almost disappeared. On the 9th November 1880 the patient met me in the street and told me that he had had a "burst" at the races, that, instead of feeling worse for it, he was feeling much better, quite his old self, but that he noticed that his hands were beginning to break out again. Next day (10th) he sent for me, and I found him enveloped in flannel, the left foot and knee, both hands and the left shoulder and elbow violently inflamed. An ointment of belladonna was smeared over the joints, a purgative given, followed by an opiate enema, and iodide of potassium with colchicum wine was freely exhibited. There was some improvement during this and the following day. Sleep was obtained in snatches, but late in the evening of the 12th, sudden and almost complete relief from pain was experienced in the foot, leg and hands, while the elbow and shoulder remained stiff and somewhat painful. I left word that the patient was to be more carefully watched than ever, and that should any unexpected symptom arise during the night I was to be summoned. Next morning (13th) there was no change, but the night had been sleepless, the patient, however, saying that he had dreamt all the time, and had seen endless processions passing the foot of his bed. Temperature under tongue, $100^{\circ} 4$ (6 30 A M), tongue brown and dry, bowels constipated. A purge was ordered, and mustard to all the joints previously inflamed. At noon the tongue was moist, the purgative had acted, temperature, 101° , but complaint was made of nausea and epigastric pain. Blister below sternum. Urine had been passed in considerable quantity at stool. The skin was bathed in perspiration. In the evening vomiting was violent after every attempt to take nourishment, but was temporarily arrested by an injection of $\frac{1}{4}$ grain of morphia. The temperature was still 101° . During the night great distress in breathing was experienced, and when I saw him at 5 30 A M (14th) he was propped up in bed breathing irregularly and with difficulty but able, when he pressed his hands firmly over the heart region, to fill his lungs completely. This manœuvre, which he had discovered for himself, was performed every half minute or so, and gave him great relief, although the pressure which he exerted over his heart was in itself painful. The stethoscopic signs were peculiar. An entered all parts of the lung freely at each of the deep inspirations just described. Placing the stethoscope over the heart, a little within the apex, which point was particularly sensitive, while the finger rested on the radial pulse, a series of three or four rapid and irregular contractions was to be observed, during which the second sound was alone to be clearly distinguished, the series being interrupted by a tumultuous contraction resembling a shake or tumble. This flutter was succeeded by the series of beats, and so on. Generally, but not always, the *faux pas* of the heart was accompanied by an intermittence of the radial pulse. The heart was beating, as nearly as could be ascertained, at the rate of 94 per minute, the pulse was (counting the intermittences) 115. Vomiting had ceased, but taking anything into the stomach increased the heart distress. A very small quantity of urine was obtained during my visit. It showed an abundant deposit of albumen on boiling. The condition remained unchanged during the day, except that exhaustion was deepening. An enema with 40 drops of laudanum was given at night, which produced occasional dozes, in the intervals between which the patient's friends thought he was delirious, but this they attributed to the laudanum. On the 15th there was a slight apparent improvement, but the temperature (6 A M) had risen to 102° . During the day he was able to lie down, but he became very restless, tossing from side to side, and rolling half over from left to right. Milk was now taken without difficulty, and in considerable quantity. He spoke quite rationally when addressed, but when not roused lay in a doze, muttering incessantly. The night was agitated, and next day (16th) bursts of maniacal delirium alternated with the muttering of the previous afternoon. The face became pale, but the conjunctivæ were injected. Vomiting recommenced, but ceased after about four hours. There was no marked heat of skin, but on account of restlessness no accurate observation could be taken with the thermometer. Death occurred on the morning of the 17th, about an hour after a violent outburst of maniacal excitement. There had been no paralysis, no muscular spasm, and until the morning of death no contraction of the pupils. Shortly before death they were observed to be strongly contracted.

This history speaks for itself. The successive shiftings of the gouty attack from point to point, each change being to a position more menacing to life than the last, were very distinctly marked. There was little opening for treatment. Vapour baths would have been given, but that the skin was bathed in perspiration from the first until about five hours before death, and that urine was secreted in some quantity. The question of cold baths did not arise, for the body temperature did not exceed 102° . Rheumatism with cardiac complications does not necessarily involve an excessive temperature, and the same would seem to be true of gout, but a distinct elevation would naturally be expected as soon as the stress of the disease fell on the membranes of the brain.

Gout in young persons, and especially in young girls, is notoriously rare. A case presented itself last year at a charitable institution in which there seems little room for doubt as to the accuracy of the diagnosis.

A girl, aged 16, of healthy appearance, daughter of a woman of drunken habits, father nobody in particular, had long been subject to occasional nervous paroxysms occurring at night, in some of which she lost consciousness. Menstruation occurred at 14 and had since been regular. The loss of consciousness was sometimes immediately preceded by a cry, but the tongue was never bitten, and there was no convulsion. She said that each attack was preceded by the rising of a ball in her throat, or by an indescribable sensation starting from her feet or ankles and travelling up both sides of her body to her head, when she became insensible. She always recovered quickly, but felt ill next morning. Tapeworm was suspected, but varied anthelmintic treatment produced no worms of any kind. Improvement was obtained during the administration of large doses of biiodide of potassium. For several months she had suffered from internal hæmorrhoids, which resisted all palliative treatment, and which, as they not only were a source of weakness from constant hæmorrhage, and of nervous exhaustion from sleeplessness caused by frequently-recurring calls to stool during the night, but also produced a persistent leucorrhœa, were finally removed by clamp and cautery. The operation was followed by the best results, but six months afterwards, while apparently in perfect health, the patient was waked one morning by pain in the left foot, which during the course of the day localised itself in the ball of the great toe. During the following three days the joint was red, hot, swollen, and tender on pressure. In addition to this there was paroxysmal pain independent of pressure, so that but little sleep was obtained at night. The fever was remittent in character, and on the second night the temperature of the mouth rose to 103° . The urine was scanty and turbid. On the third day the ankle was slightly affected, but this came to nothing. Under purgatives and iodide of potassium the acute symptoms rapidly subsided, leaving nothing but œdema, which lasted for about a week, and was followed by desquamation.

This array of symptoms can hardly be accounted for except on the supposition of gout. The occurrence of a second attack would settle the matter, but it is probable that I shall have to wait many months before getting this confirmation.

The case of general tuberculosis which proved fatal in December presented itself in a boy, aged 11, who three or four years before had narrowly escaped death by typhoid fever. Previous to the typhoid fever he was, according to his parents' account, healthy and strong. Subsequently he became delicate and was observed to grow very fast.

Early in October, without any special warning, he voided a large quantity of blood by stool. On examination the abdomen was found tender and swollen, and the stools watery, offensive and blood-stained. There was deposit all through the left lung and in the upper lobe of the right. There was some cough, but this was not a distressing symptom. For several days diarrhœa continued, but gradually

became less violent, and at the end of a fortnight was succeeded by constipation. Immediately, hæmorrhage from the lungs, apparently from both, set in, and before it could be effectually checked the child was blanched. A few days respite seemed now to promise improvement, but the lull was succeeded by a renewal of hæmorrhage from the bowels. This cycle was accomplished once more during the following six weeks, at the end of which time death occurred. There was very little fever at any time, but it was noticed that the evening temperature rose from 1° to $1^{\circ}5$ shortly before each attack of pulmonary hæmorrhage. During the lulls appetite returned, and along with food a considerable quantity of cod-liver oil was consumed. Death was apparently due in the main to exhausting hæmorrhages from the bowels. Although a careful examination three days before death failed to discover any portion of lung unaffected by disease, there was neither cough nor dyspnoea. The absence of dyspnoea was no doubt accounted for by the diminished bulk of blood demanding to be oxygenated.

The following case is interesting as an example of a complication of diseases. That the existence of tumour in the posterior portion of the brain gravely influenced the course of the pneumonia can hardly be questioned.

Tumour of Brain, Pneumonia terminating in Gangrene, Death—The patient, a man of about 40 years of age, consulted me in October 1880 about his sight, which had been failing for about two years. As he entered my room I noticed that his left leg dragged a little, and that progression was unsteady. His speech was jerky in character, alternating between rapidity and drawling. Intelligence was evidently unaffected, for he gave a lucid and lengthy account of his symptoms extending over about three years. He had never had syphilis, nor was he aware of any nervous or other disease in his family. He was married and had three healthy children. His health was good until at an outpost he sustained a sunstroke in 1878. He knew very little about what occurred to him then, further than that his life was despaired of for several days. Convalescence was slow, and shortly after he resumed his occupation he observed that sight was failing nearly equally in both eyes. After some ineffectual treatment he returned home, where he placed himself under the care of the late Mr SOELBERG WELLS. His sight steadily became worse, and finally he was (according to his own account) told that perhaps a sea voyage might benefit him, and was therefore recommended to return to China. This he did, arriving in Shanghai some time during last summer. He soon found that he was unfit for work of any kind, as uncertainty about the size and shape of surrounding objects made it almost impossible for him to guide himself. Hence his application to me. He now complained of severe frontal pain of a paroxysmal character, accompanied by stiffness of the neck muscles, and generally worse at night. There was frequently-recurring nausea, never followed by vomiting, except when he artificially induced it for the sake of relief. He constantly felt giddy, but never fell. I ascertained that this vertigo was not increased by shutting the eyes and taking two or three steps. He had occasionally noticed that the fingers of the left hand were affected by an involuntary and fugitive contraction. There was nowhere any defect of common sensibility. The pulse was 60, of high tension, the temperature under the tongue (4 P.M.) was 99° . On superficially examining the eyes the first thing that engaged the attention was the existence of double horizontal nystagmus, which presented this peculiarity, that the oscillations were more violent when the patient was desired to direct his eyes in an upward and oblique direction, and obviously interfered with his power of doing so. He was quite unable to read any type or to distinguish colours. The pupils were sluggish, but equal and of natural size. Ophthalmoscopic examination revealed double optic neuritis. The circumference of both discs was cloudy, but degeneration was farther advanced in the left eye than in the right. The left papilla was atrophied, looking like a flat depression (direct image), while a sort of halo was formed round it by closely set radiating streaks of a dull white. The arteries were hardly to be made out, but a few veins were distinct. On the right side the disc was pale, but many large and tortuous veins, as well as a few shrunken arteries, were easily brought into view. There had been no pain previous to the ophthalmoscopic examination, but next day the patient complained

much of a feeling of tension in both eyes, with diminution of the little power of vision he before possessed. The pain passed away in a day or two, but he maintained subsequently that the beam from the mirror had certainly harmed him in a permanent manner.

He returned three or four times at short intervals, and then I lost sight of him for a few weeks. On the 19th November I was sent for. Five days before he had had a severe shivering fit, followed by diarrhoea, agonising headache, and pain in the right side, increased by any attempt at deep inspiration. He had been sleepless for three nights. His skin was yellow and dry, his expression stupid, though he described his subjective symptoms clearly enough, his features were drawn, his eyes sunken, and his voice reduced to a whisper. There was a purple flush on the right cheek. The lips were blue, the tongue dry, red at the point, brownish yellow in the centre. Pulse irregular and dicrotic, 120, temperature under tongue, $103^{\circ}5$ (11 A.M.), respirations, 36. Although the breathing was of this panting character, no complaint of dyspnoea was made. Cough was constant and very painful, expectoration scanty and of the colour and consistence of prune juice. Breathing was abdominal, but so far as the chest expanded at all, both sides appeared to expand equally. There was absolute, high-pitched dulness on percussion over the lower two-thirds of the right back, with crepitation and bronchophony over the same area, and an intense soufflé over the space of the palm of a hand in the centre of the crepitating area. Supplementary respiration was being carried on by the upper two-thirds of the left lung, but the lower third was dull, breath sounds were absent, there were no râles audible, no crepitation, and a complete absence of vocal vibration even when the patient spoke with effort. An emetic of ipecacuanha, followed by free administration of wine, relieved the more urgent symptoms. The skin became moist, the diarrhoea was checked, and quiet sleep for four hours was obtained. Dry cupping to both sides, and jacket poultices of linseed meal sprinkled with mustard, brought about temporary improvement. Milk was given in large quantities, alternating with wine, strong soup and coffee. Next day the expectoration was more profuse, and the patient for an hour at a time would cough up rusty sputa of the ordinary pneumonic character. This would be succeeded for several hours by the prune juice expectoration first observed, and during the remainder of the illness there was but little change in this respect. On the 10th day from the initial rigor (23rd November), all the symptoms were aggravated. The expectoration was black and viscid, and exhaled a fetid smell, which was distinguishable equally on the patient's breath. The areas which before were crepitant were now the seat of large moist râles, the patient hardly slept, and when he did he muttered incessantly. When roused he expressed his pleasure at feeling so well. The respirations were 40, the pulse, 140, temperature in mouth, 104° , urine scanty, s.g. 1.026, no albumen, and showing a faint trace of chlorides. The patient now gradually sank, still, however, taking milk and wine in considerable quantity. The expectoration became scanty merely because there was not sufficient strength to enable it to be expelled, but the little that was coughed up was horribly offensive. On the 29th a necessarily brief examination showed that respiration was cavernous throughout almost all the right lung and in the leftillary region. Below the nipple line on the left side nothing could be made out, and the back was not examined. Intelligence was preserved up to the afternoon of this day. In the evening several large and involuntary passages, chiefly of altered blood, occurred from the bowel, and death followed during the night.

Postmortem, 12 Hours after Death—Liver, spleen and kidneys not particularly examined. All were softer than natural, but otherwise apparently unaltered. Mucous surface of small intestine injected throughout, the bowel containing much gummy fluid. Stomach healthy but for a small, partially healed ulcer on the posterior surface, close to the pylorus.

Both pleurae were thickened and opaque, small, old adhesions existing in several places. The left cavity contained about 16 fluid ounces of reddish serum without any flakes of lymph. Soft yellowish lymph was smeared over the surface of the right pleura, and a small quantity (about 5 ounces) of bloody and purulent fluid was found in its cavity. At the apex of the left lung was a calcified deposit about the size of a walnut and of the consistence of mortar, the lung immediately round it being dark but firm. On the right side, at the apex, a like calcified deposit was found, but much harder than the other. It was

the size of a Brazil nut, and completely encapsuled in firmly condensed tissue. Corresponding to it was a depressed, adherent scar on the pleura. On both sides the deposit was quite cut off from the general lung tissue, which at the distance of half an inch from its border was healthy.

The middle and lower lobes of the right lung and the lower lobe of the left were broken down into a blood soaked pulp, which retained little or nothing of the original shape or appearance of the lung tissue, and was in many places diffuent. The lower portion of the upper lobes was congested, but between this and the patches of deposit in the apices the front of both lungs was reasonably healthy. The backs, however, were so goiged, or rather soaked, with blood as to be impervious to air. The small portions which remained available as breathing space crackled under pressure between the fingers. On both sides, but more extensively on the right, the lining membrane of the bronchial tubes was purplish (soakage), the smaller tubes contained much blood stained mucus and bloody fetid fluid, while those of the first and second order contained a reddish exudation of sufficient consistence to be partially withdrawn without breaking.

The heart was large. The right ventricle was full of soft clot, with several nearly colourless concretions among the columnæ. A firm white clot occupied the pulmonary artery, extending a little way (about $\frac{1}{2}$ inch) on both sides beyond the bifurcation. There was nothing particular to be noted on the left side.

A mass of enlarged glands in the posterior mediastinum compressed and sensibly flattened the right bronchus.

Both pneumogastric nerves were carefully dissected out to the points of their exit from the skull, and were found to be (to the naked eye, at least) perfectly healthy.

When the skull cap was removed, the dura mater presented a natural appearance on the convexity, but on attempting to remove the brain a small collection of greenish pus welled up at the right side of the foramen magnum from between the membrane and the bone. The dura mater was highly injected for about the space of a dollar all round the spot where the pus lay, but no disease of bone could be discovered in the neighbourhood or elsewhere. There were no clots in the sinuses, which, moreover, were not remarkably full of blood, though the veins of the pia mater were goiged. The brain was so soft that it hardly retained its shape when laid on the table, and the cerebellum was almost diffuent so diffuent, in fact, that no satisfactory section of it could be got. The ganglia at the base of the brain were apparently healthy, the lateral ventricles contained each about a fluid drachm of turbid fluid. The choroid plexus was dark red from distension. The central white substance of the brain was throughout of a yellowish tinge, mottled by puncta cruenta, which could not be washed away by a gentle stream of water. At the posterior extremity of the centrum ovale on the right side, and occupying nearly the entire thickness of the couche moyenne, a single, more or less elastic and highly vascular tumour was discovered of an ill-defined oval form, about $1\frac{1}{2}$ inch in length by $\frac{1}{2}$ inch in width. This was surrounded by softened medullary substance for a distance of about $\frac{1}{4}$ inch, beyond which limit this substance, though sharing in the general softness of the whole brain, did not seem to be specially affected by the vicinity of the tumour. An extremely fine layer of apparently healthy brain tissue separated the lower surface of the tumour from the distal portion of the lateral ventricle. Corresponding to the inner surface there was a slight bulging inwards (perhaps accidental) of the præcuneus. In the left hemisphere, in the region exactly corresponding to the tumour, there was a softened and vascular patch surrounding an ochre-coloured spot, evidently the remains of an old small hæmorrhage. This ochre coloured spot was about the size of a pea.

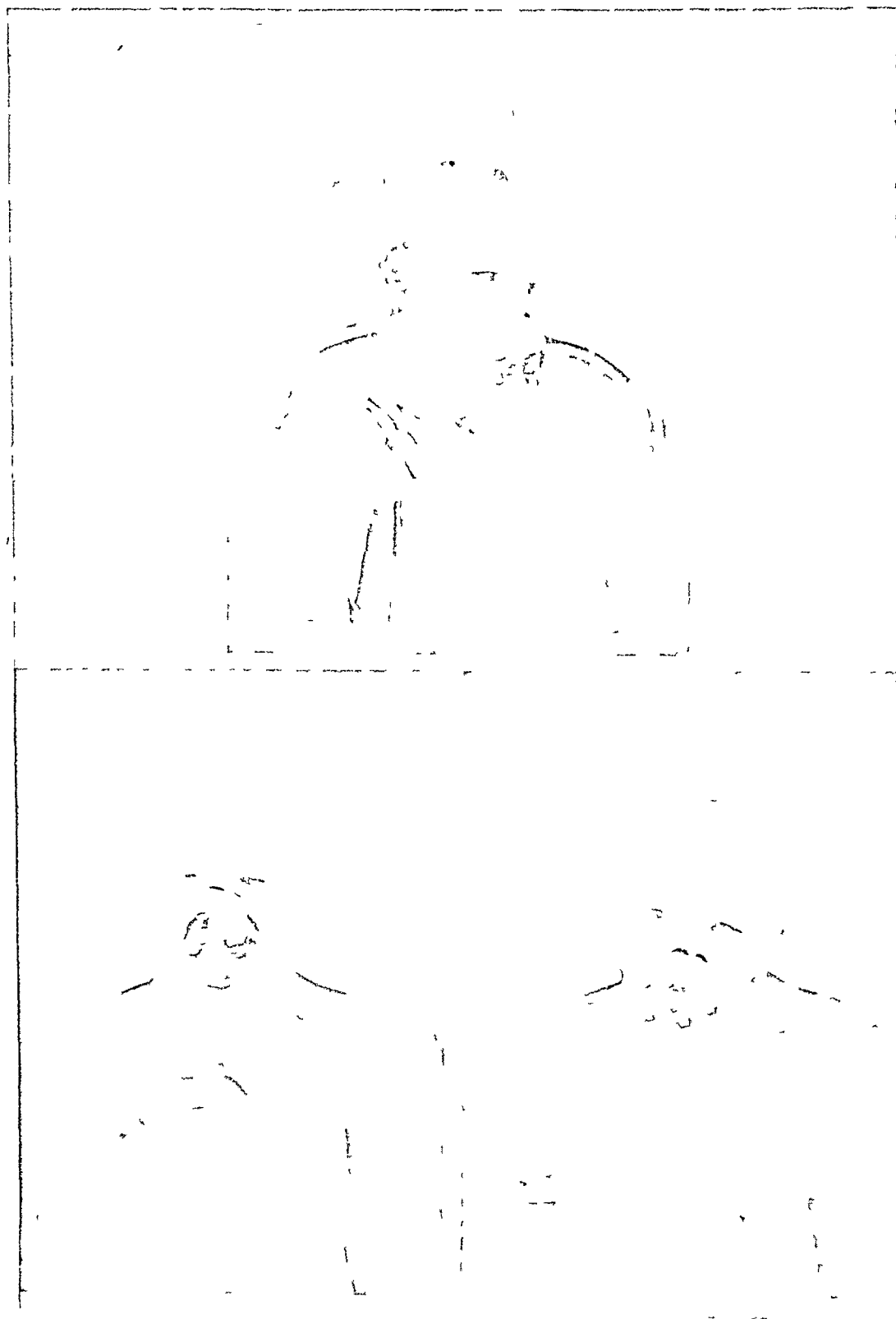
The tumour was indistinctly trilobed, and under a hand lens seemed to be composed of a soft granular substance, exhibiting numerous minute extravasations on its cut surface. Under the microscope ($\times 250$) it exhibited "cement granules" and compound corpuscles, without a trace of nerve fibres. It was therefore a glioma. I am inclined to think, although I cannot at the moment find authorities to support my opinion, that the occurrence of glioma in the posterior portion of the centrum ovale is rare.

I have dwelt at what will perhaps be considered extravagant length on this case. My excuse is partly the interest which it excited in my own mind, for when not expecting that I should have a chance of controlling the diagnosis by a postmortem examination, I had thought it probable that the patient was suffering from a tumour in the cerebellum. It was at least true that the entire cerebellum was the seat of degenerative change, but there was no evidence of either hæmorrhage or tumour in its substance. Even with the vastly increased means of cerebral localisation that we now possess, accurate diagnosis of the precise seat of a tumour is often, if not generally, impossible. Whether the tumour had anything to do with hurrying the pneumonia into the gangrene which closed the scene, need scarcely be discussed. Just as inflammation of the lungs is a common cause of death in the aged* and in those affected by diatheses, it is likely to be specially fatal in any other condition under which the vital powers are enfeebled. In diabetes, for instance, the lowering of the general vitality renders all the soft tissues exceptionally liable to inflammation, and the same cause operating after inflammation is set up makes that inflammation prone to assume a gangrenous character.

The group of photographs on the opposite page represents the condition of a little girl brought to the Gutzlaff Hospital for treatment.

Sarcoma springing from Base of Skull, involving all the Bones of the Face except the Lower Jaw, Operation, Death—WANG MAIYUNG, native of the Shanghai district, aged 13, entered hospital 29th August 1880. Two years ago a small swelling was noticed on the right side of the palate, apparently connected with one of the molars. It was painful, and a Chinese doctor first cut it, under the impression that it was an abscess, and then extracted the tooth, which meanwhile had become loose. Pain ceased, and although the face began to swell rapidly, and speech and mastication were seriously hindered, no further notice was taken of the growth until six months ago, when the child began to complain of total inability to chew or even to swallow rice and vegetables, and soon lost all power of articulation. It was noticed that she was very stupid at times, and that on the right side she was deaf. She was taken to as many native doctors as the parents could afford to employ in succession, each of whom promised a speedy cure, and ordered enormous quantities of medicine, which for the most part the parents could not buy. Within a few weeks breathing had been interfered with, and indeed could not be performed at all except in the sitting posture. Meanwhile the only nourishment that could be swallowed was rice congee. The photographs which represent the front face and the profile give an excellent idea of the child's appearance and of the visible extent of the disease, but that intended to display as far as possible the palatal surface is deceptive, as one would suppose that a considerable free cavity existed in the mouth. In fact, however, the roof of the mouth was completely occupied by a smooth, shining, convex and densely hard mass extending to the pharynx, which latter could not be seen, nor could the finger be inserted sufficiently far back, or moved about with sufficient freedom, to ascertain the posterior or left lateral limits of the growth. There were a few scattered spots of superficial ulceration on the palatal surface in the neighbourhood of the distorted alveolar border. The lip was adherent to the tumour for about 1½ inch in front and towards the right angle of the mouth. A probe passed freely in an upward and outward direction into the left nostril, but could not be introduced into the right. External examination showed but little distortion of the left side, and on the right side the lower segment of the circumference of the orbit felt natural. There was no protrusion of the eye, and no interference with vision. During the night which followed her admission I was called, as she seemed suffocating. I was about to open the trachea when the attack lessened in violence, and shortly afterwards passed by. The child was put on a diet consisting chiefly of milk, bottled porter, and cod-liver oil, and soon began to pick up strength. At the same time, however, the tumour

* La pneumonie est l'affection la plus fréquente et la plus fréquemment mortelle de la vieillesse — PETER, *Clinique Médicale*, 1 699 (2me éd. Paris, 1877)



increased with alarming rapidity, so that by the 17th September difficulty was experienced in swallowing even liquids, and breathing became much embarrassed. Meanwhile it had been decided in consultation that although the tumour was probably a growth from the base of the skull, there was a possibility of its being confined to the right superior maxilla, the condition of the mouth making it impossible to ascertain whether the apparent encroachment on the left side of the palate was or was not due to pressure. At all events the child, if left to herself, must die of starvation, if not more quickly of suffocation. Her father, who was frankly told all the dangers which surrounded each course of action, settled the question by saying that as the hospital nourishment was the only thing that was keeping her alive, as she could not have that except in the hospital, and as even with that she was clearly going to die, if there was any chance of an operation succeeding, trial had better be made of it, provided that in case death followed I could guarantee that it would not have been rendered more painful by the operation*. It was easy to set his mind at rest upon this last point. Accordingly, on the 19th September I operated in the presence and with the valuable assistance of Drs BOONE, HALL, and ROGERS. In view of the probability of severe hæmorrhage, a practically inexhaustible supply of forceps and ligatures had been provided. Thanks to this precaution, and to the quickness with which every vessel, large and small, artery or vein, was caught as soon as cut, the loss of blood, considering the formidable character of the operation, was almost incredibly small. It was variously estimated by those present at from 4 to 7 fluid ounces, and was probably between 5 and 6 ounces. A first incision from the inferior internal angle of the circumference of the right orbit to the middle of the edge of the upper lip not giving sufficient room, the knife was carried along the lower border of the orbit to the middle of the external surface of the malar bone. The cheek and lip being thrown back, the tumour was seen to fill the zygomatic fossa, sending a prolongation upwards to the orbit, and upwards and outwards into the temporal fossa, surrounding and involving the malar bone. The right superior maxilla was now loosened in the usual way, and removed, along with the malar bone and the mass of adherent tumour, opening up the orbit from below. It was then found that the left superior maxilla was involved, and this was removed, with the left malar, which formed part of the mass. The superior maxillary, palate, malar, nasal, lachrymal and inferior turbinated bones of both sides, as well as the vomer and the ethmoidal cells, having now all disappeared, a remaining portion of the tumour was seen springing from the anterior extremity of the inferior surface of the body of the sphenoid, and from the uniform and remains of the perpendicular plate of the ethmoid. This was carefully cleared away, along with the corresponding portion of periosteum, the bone surface looking healthy. The soft parts were brought together, after a most minute examination, which satisfied us that no portion of the tumour was left behind. A loop of silk was passed through the tongue and fastened to the cheek. The operation occupied 35 minutes, the chloroform was well borne, and recovery from it was complete. About an hour afterwards the child made signs that she wanted something to drink, and a little milk being poured over her tongue she showed dissatisfaction, and made it understood that she wanted tea, which she got. She made several attempts to drag away the string which held the tongue, but was of course prevented. She then went to sleep, and remained dozing quietly for two hours, after which she passed urine, and again slept. An hour later she was seen sleeping by the native assistant, who left her for a while in her father's charge. On his return in half an hour he found her dead. Recovery from such an amount of mutilation was hardly possible, but I am inclined to think that the immediate cause of death was a surreptitious loosening of the loop by the child's father, whereby the tongue was allowed to fall back to an extent sufficient to close the entrance to the glottis. Shock, hæmorrhage and chloroform seem to be excluded. Syncope is a possible cause, as it is proved by DURET† to supervene occasionally several hours after a severe operation, and to occur in this insidious way most frequently after operations on the face.

* This elaborate review of all the cases that might arise, and the intelligence displayed in the decision he finally arrived at, astonished me not a little in an ordinary Chinese peasant. He was a stupid looking fellow enough, but he was devoted to this little girl, and affection had doubtless sharpened his wits.

† *Des Contre indications à l'Anesthésie chirurgicale* (Thèse d'Aggrégation en Chirurgie, 1880)

Sections of the tumour were examined by Dr BOONE, who found that it was almost exclusively composed of spindle and giant cells, showing little trace of intercellular tissue, and with no apparent tendency to calcification in any part. The entire mass was, as described above, removed in three pieces. Exploration made from each of the surfaces thus presented failed to discover any remains of healthy bone. The ethmoid and all the bones of the face, with the exception of the lower jaw, had in fact been invaded and swallowed up by the tumour in its advance.

As documents having a place in the medical history of the settlement, and without reviving the criticism once aroused by the details of the lock hospital system as applied to Shanghai, I reproduce the following extracts —

1° *Extract from Despatch dated 5th April 1880, addressed by the Chairman of the French Council to the Chairman of the Anglo-American Council* — Le Conseil, tout en reconnaissant que le dispensaire rend des services, ne pense pas qu'il puisse donner des résultats effectifs tant que les femmes malades ne seront pas retenues à l'hôpital jusqu'à leur complète guérison. Il propose donc à la majorité de supprimer pour l'exercice prochain la somme qui est allouée pour participation aux dépenses de ce service, se réservant de contribuer de nouveau lorsque de sérieuses réformes auront été apportées au système actuel.

2° *Extract from Dr PICHON'S "Rapport sur le Service médical de la Municipalité française pendant l'année 1880"* — Le Conseil a pris (depuis le 1^{er} Octobre 1880) la résolution de contribuer de nouveau aux dépenses occasionnées par le dispensaire des filles publiques. Cette décision, dont je remercie hautement le Conseil, aura pour effet de consolider d'une façon définitive le fonctionnement du dispensaire dont la création et le maintien avaient rencontré tant d'obstacles jusqu'ici.

In connexion with this subject it is not amiss to recommend caution about matters apparently trivial, and which would not suggest themselves at first sight as sources of danger. Bearing in mind the mode of manufacturing tobacco, and the filthy habits of all Eastern people, there seems no reason, for instance, why cigars and cheroots, when held between the lips without the protection of a cigar-holder, should not convey syphilis if there should be any accidental breach of skin surface. Shaving, too, performed by a Chinese barber, whether he uses his own or his customers' razors, may prove a very dangerous operation. One must see in order to believe the extraordinary calmness with which a native extern patient at a hospital wipes the surface of a chancre with his finger before submitting it for inspection. There is no question of washing his hands afterwards. It is true that the same thing may be seen any day in the out-door practice of every English or Continental hospital. But suppose the patient a barber, and suppose an accidental scratch during the process of shaving, the delicate head swept off a pimple for example, the consequences are likely to be serious. For invariably whenever a barber makes a scratch his first impulse is to smear his finger over it, thus in the case supposed very probably inoculating it. Many years ago I had two cases of syphilis occurring within six months of one another, both in members of the out-door staff of the Customs. This was in itself surprising, for that staff was then, as now, endowed, I apprehend, with almost saintly virtue, inasmuch as it was and still continues remarkably free from venereal affections. These cases were, however, otherwise curious.

One man had an ashy ulcer with a cartilaginous rim and base on the lower lip, close to the right angle of the mouth, an ulcer which if situated on the penis would not have left the slightest opening for doubt. The submaxillary glands on the same side were slightly enlarged and hard. There was nothing to be seen within the mouth. The ulcer healed under mercury, but the glands continued hard, and six weeks

later a roseolæ eruption, followed by sore throat, and later by uritis, confirmed the diagnosis. This man was shaved every day by a native barber, who brought his own apparatus with him.

The second case occurred shortly afterwards. A man had enjoyed a trip to Japan, where, according to his own account, his conduct had been exemplary. About three months after his return he found that his body was covered with copper-coloured blotches, which he imprudently showed to an experienced friend, whose opinion as to their nature was expressed with uncompromising frankness and unnecessary publicity. He came at once in order to have this scandal refuted, and showed me his chest and forearms, which told their own tale. I examined the penis and groins. The result of this latter exploration was altogether negative. I then stripped him, and found on the left arm an elaborate device in many-coloured inks which he had had tattooed by a Japanese artist. This he said had always been a little irritable. It was limited by a slightly thickened margin, which with the immediately surrounding skin was of a colour similar to but somewhat deeper than that of the blotches scattered over his body. A course of specific treatment was giving satisfactory results in this case when the patient was removed to another port, and I lost sight of him.

Recently I have found similar cases reported. Thus, DESPRES (quoted in *London Medical Record*, 1881, page 160) details two instances of inoculation of syphilis by razors, and M. ROBERT, a French army surgeon (quoted *ib* 1880, page 159), relates three cases of infection by a tattooer who being at the time suffering from syphilis, with mucous patches about the mouth, used his saliva to dilute the ink employed. Persons who are about to visit Japan and contemplate bringing away with them a specimen of the tattooer's art will do well to bear these facts in mind, and the additional fact that, according to Dr. SIMMONS of Yokohama, three out of four of the urban population of Japan are syphilitic.

In my last Report I referred briefly to the frequency with which measles is observed in Shanghai, and the differences from the English type which it presents, as regards course and symptoms. The following description is drawn from the observation of a very large number of cases —

Chinese Measles — On each occasion of late years when an epidemic of measles has occurred I have learned, either from information received beforehand or as the result of inquiries subsequently made, that a disease of similar character was prevalent among native children in the settlement. It is therefore probable that each outburst is due to infection imported into foreign houses by native servants. When once it has entered a foreign family its spread is inevitable, for Chinese measles is as contagious as the ordinary European variety during the catarrhal stage before eruption. In support of this assertion I might cite a number of cases, one of which occurred in my own family. At the beginning of the catarrhal stage when it is supposed that a child is suffering from an ordinary cold, no precautions are taken to isolate it from other children in places of public resort or to exclude it from juvenile parties.

The following instance, without proving anything, as the incubation period must be considered doubtful, may be accepted as an illustration of the dangers thus incurred. Two children, brother and sister, were invited to a large garden party during the last week of March. The girl went, but the boy was kept at home, as he had "a cold." Two days later the eruption of measles appeared on him. Four days after the party one of the children who had been among the guests sickened, a day later three more, and so on, so that within 13 days 17 of the children who had been at the juvenile gathering were either ill or recovering. These were all under my care, and there may have been other cases of which I did not hear. Some of these children spread the infection still wider. Oddly enough, the little girl herself sickened 13 days after her brother, and passed through a severe attack, followed by eye troubles of some gravity (superficial ulcers of both corners), and that although she had had measles of average severity twelve months before. It is possible that here there may have been other centres of infection, but very careful inquiry failed to discover them.

Related in point of time to each epidemic of measles we have had a prevalence of whooping cough. In four cases during the past season I found measles immediately follow on whooping-cough, and in five

cases immediately precede it. In two out of the latter group the history of subsequent separate infection was clear, and doubtless might have been made out in all the rest. At all events, it may be asserted that here, as in Europe, either disease predisposes to the other. The Chinese form of measles does not protect against measles when a child returns to Europe, nor does English measles (always) protect against it, nor, finally, does it protect against a second attack of the same form.

I have but one observation sufficiently precise to aid in determining the period of incubation.

In this case a child, after having been exposed during the greater part of the afternoon of the 31st March to the contagion of measles in the catarrhal stage, was through accidental causes isolated. A day or two afterwards the cough to be presently mentioned, was observed. On the 9th April he had headache, fever and injected conjunctivæ, and on the 13th April the rash appeared.

This (neglecting the occurrence of possibly prodromal cough) would give an incubation period of 10 days, and Dr PICHON informs me that in three instances he was able to fix with certainty that period at from 8 to 10 days. Further observations on this point are essential.

It often happens that the first symptom observed is a dry, hacking cough, which persists for some days before the patient complains of feeling ill. At the end of a variable time he is found to be irritable and feverish, probably has bilious diarrhœa, perhaps amounting to severe purging (occasionally constipation), loses appetite, and vomits once or twice in the day. The conjunctivæ are injected, there are sometimes fits of sneezing, the skin is hot, especially at night (100° to 102° 5), the tongue is occasionally dry, and the child may talk in his sleep, or wake several times in fright from a series of troubled dozes. Severe pain in the circular muscles is not uncommon. I have never seen convulsions. In three cases occurring in adults there was marked delirium, especially at night. Vomiting may be persistent for two or three days. Hæmatemesis occurred in one of my cases, a healthy, well-nourished little girl, aged 6. The vomiting may be independent of cough, or caused only by the cough*. Severe epistaxis may occur and be repeated several times. This I observed in an adult, and in a boy of 13 (seen in consultation), in which latter this and the delay of the eruption to the eighth day had given rise to the suspicion of typhoid. As the fever persists the eyes become more injected, there is much lachrymation and photophobia, but the comparative slowness of the nasal catarrh is generally remarkable. From the second to the fourth day of the fever much complaint is made of the throat, and on examination it is found that the soft palate, pillars and back of the pharynx are highly injected, while simultaneously with, or a little before the appearance of the skin eruption minute brilliant vesicles dot the palate and pillars.

In three cases I found a tenacious muco-fibrous deposit on the tonsils, which was brushed away with difficulty, leaving, however, an unbroken though highly congested surface exposed on its removal. The cough during these early days increases in severity and is always paroxysmal. Auscultation reveals pretty equally disseminated bronchial râles, but it has not happened to me to observe any severe pulmonary complication in children. In three adult cases (and probably also in children who cannot accurately describe what they experience) there were early deafness and the sensation of singing in the ears. On any day from the second to the eighth from the first symptoms of fever or catarrh, the rash may appear. Its order of eruption is very variable, but I have several times observed a faint efflorescence on the skin at the external and inferior borders of the orbits, which may or may not persist, announcing the approach of the eruption, which may then openly declare itself first on the forehead or cheeks (with nearly equal frequency), on the neck, followed by the forehead and face, and then by the trunk, arms and legs, or on

* This I observed in but one case—in an adult. The rule is laid down somewhat too peremptorily that vomiting caused by cough is absolutely diagnostic of either whooping cough or pulmonary tuberculosis. Thus, Professor PETER (*Clinique Médicale*, 2me éd., p. 524) says—"Un phthisique est pris d'un irrésistible besoin de tousser, mais en même temps qu'il toussé il rejette ses aliments. Dans une autre maladie encore, on vomit en toussant et par le fait de la toux, dans la coqueluche. En dehors de ces deux maladies, jamais la toux ne produit de vomissement, de sorte que le cas échéant, on n'a plus qu'à faire le diagnostic entre elles deux." In the case to which I refer the patient was not phthisical, nor had he whooping-cough. Here, perhaps, the undoubted relation between measles and whooping cough may be invoked.

the body followed by the face. The rash is generally thick and somewhat purple in colour on the legs. Occasionally it is seen first on the wrists, and frequently it appears simultaneously on the wrists and face. I have never observed a fall of temperature on the appearance of the eruption. On the contrary, when it sometimes happens, the rash disappears partially or entirely on the second or third day, its reappearance is generally (not always) heralded by a marked rise of temperature ($1^{\circ} 5$ to 3°). I have seen it disappear for 36 hours from the face while its evolution was going on regularly over the body, then reappear and persist on the face until the ninth day, when it finally vanished, the body and extremities having then been clear for nearly two days.

In one case (an adult) the rash which had come out thickly on the face disappeared the same evening. During the night severe bronchitis declared itself, and continued for a week, with profuse mucopurulent expectoration, the course of the bronchitis being apparently unaffected by the reappearance of the eruption, which occurred on the day but one after it had suddenly faded.

There is seldom any regularity in the shape of the patches of eruption. A mottling, or sometimes flea-bitten appearance of the skin is observed in the regions above enumerated, and next day the spots are recognisable as minute papules, which very rarely (in my experience) reach the size sometimes attained by the papules of European measles. It may happen that no more is found than a mottling of the skin of the face, but the fever (slight or severe), the conjunctivitis, the throat congestion, and especially the appearance of vesicles on the soft palate and pillars, leave no doubt as to the diagnosis. Occasionally sudamina are found on or among the papules, and in this case there is always fine, dust-like desquamation, but independently of sudamina desquamation of this kind is sometimes to be noted. The rash begins to fade, not always in the order of its eruption, on any day from the third to the seventh, dating from its first appearance, while the fever usually disappears from the seventh to the ninth day of the catarrh, and whether the rash has or has not completely faded. The rash finally disappears between the fourth and tenth day from its first appearance, but seldom later than the seventh day. I have rarely noticed any special tendency to glandular enlargements. In one of the cases referred to above, where there was a semiformous deposit on the tonsils, the cervical glands became swollen and tender 10 days after the eruption had cleared away from the general surface.

The highest temperature I noted was $104^{\circ} 5$. This was at 11 P.M., in a little girl, on the third day of the fever, and immediately after the disappearance of a rash which had covered the trunk and arms during the day. Usually the temperature ranges between $99^{\circ} 5$ and 103° . A rise of from 1° to 2° may be anticipated at night, and especially in cases where the throat is severely attacked.

The youngest child that came under my care was aged 8 months.

In this case the eruption appeared on the second day, on the forehead. On the third day it came out on the arms and trunk, next day (fourth) on the legs. On this day it began to fade from the face, and on the fifth day had completely disappeared. There was not much fever, but cough was very severe.

Among the sequelæ nothing of very serious import is to be noted. This is no doubt due to the good conditions under which most foreign children in Shanghai are placed. I have been unable to get any trustworthy account of the natural history of the disease among natives, but one can hardly suppose that Chinese children are exempt from the serious troubles which frequently follow measles among ill-nourished children in Europe. There is perhaps a tendency to bowel derangement for several weeks after the last symptoms of the disease have passed by, and once, in a case referred to above, superficial ulcers on the corners demanded a prolonged constitutional and local treatment before recovery was complete.

It may be noted that measles in the host disagrees with lumbricoid worms that happen at the time to be guests. In five of my cases during last season, as the attack of measles was passing off, three, two (twice) and one (twice) dead round worms were expelled.

I have never seen small-pox in a vaccinated European child in Shanghai.

*L—D^r R G WHITE's Report on the Health of Chinkiang for the Year
ended 31st March 1881*

THE health of the community has been unusually bad during the past year, and specially bad for the last nine months. Considering the cool weather we had in the summer, the reverse might have been expected, but doubtless in the summer the weather may be injuriously cool as well as injuriously hot. There was an unusual number of lung cases, as well as some cases of small-pox and typhus fever. The accompanying table will give all necessary information as to the meteorology of the port. I am indebted to Mr Harbour Master GUNTHER for its details.

METEOROLOGICAL TABLE for the Year 1880

MONTH	ANEROID BAROMETER				THERMOMETER.				WINDS					FOG, RAIN, AND SNOW			
	Highest by Day	Lowest by Day	Highest by Night	Lowest by Night	Highest by Day	Lowest by Day	Highest by Night	Lowest by Night	No of Days N to E	No of Days E to S	No of Days S to W	No of Days W to N	No of Days Calm	No of Days Fog	No of Days Rain	No of Days Snow	Runfall
	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>Inch</i>	<i>°</i>	<i>°</i>	<i>°</i>	<i>°</i>	<i>D h</i>	<i>D h</i>	<i>D h</i>	<i>D h</i>	<i>D h</i>	<i>D h</i>	<i>D h</i>	<i>D h</i>	<i>Inch</i>
January	31 17	30 48	31 17	30 48	44	25	42	24	15 9	5 6	2 21	7 12			3 0	8 0	1 77
February	31 04	30 43	31 05	30 43	44	32	45	30	17 9	4 18	0 6	6 15		1 0	3 12	2 0	2 28
March	31 04	30 01	30 98	30 11	72	35	67	34	12 15	11 21	3 9	2 6	0 21	1 0	4 0		1 78
April	30 87	29 94	30 81	30 02	73	47	71	43	7 15	10 18	4 12	7 0	0 3		5 3		5 00
May	30 50	29 81	30 50	29 82	82	55	80	54	4 9	11 12	10 15	4 9	0 3	2 0	3 18		0 84
June	30 34	29 93	30 38	29 93	86	68	83	62	4 12	15 3	4 12	5 0	0 21		1 0		0 84
July	30 20	29 90	30 17	29 90	88	69	88	70	15 9	6 21	3 9	5 3	0 9		2 18		3 37
August	30 37	29 85	30 40	29 86	89	68	85	68	22 15	3 21	1 3	2 21	0 12		2 21		2 22
September	30 80	30 22	30 78	30 25	85	67	83	66	15 12	10 0	0 6	3 15	0 15	1 0	2 0		1 65
October	31 05	30 42	31 05	30 42	76	50	72	50	14 18	13 9	1 6	1 3	0 12	2 0	1 9		0 59
November	31 20	30 42	31 20	30 45	65	29	63	28	8 15	3 12	3 0	10 15	2 6		0 6	0 12	0 08
December	31 50	30 65	31 48	30 76	53	24	48	22	11 0	5 12	0 9	12 21	1 6	0 12	1 6	2 3	1 24

REMARKS.—First part of January fine, from 10th to 24th, snow and rain at intervals, latter part of month fine. First part of February mostly rainy and disagreeable weather, snow on 4th and 20th, latter part fine, with a few dull and rainy days. March, very fine, with only a few rainy days, on 18th, thunderstorm accompanied by heavy showers. April, beautiful weather, with occasional heavy rain, on 23rd, strong gale from N W. May, beautiful weather, only a few foggy and rainy days, and occasional thunderstorms, accompanied by light showers, on 30th, gale from N W. June, beautiful weather, latter part of the month thunderstorms accompanied by heavy showers. July, fine, with occasional thunderstorms accompanied by heavy showers. August, beautiful weather, with occasional light showers. September, fine, with a few rainy days. October, very fine and clear weather, on 25th, strong gale from N E. November, very fine and clear weather, with occasional windy days, 7th and 25th, gale from N W, 28th, heavy fall of snow. December, fine, with occasional cold and windy days, on 14th, 16th, 18th and 19th, snow, and on 18th, strong gale from N E.

The thermometer readings are a little below the average temperature, owing to the unusually cool place where the instrument is hung.

A case of small-pox occurred in June

The patient was of intemperate habits, and the disease threatened during the first week to prove severe. Tepid baths were most valuable in reducing temperature, and a good recovery was made. Unfortunately, contrary to orders, being tired of solitude and possibly of abstinence, the patient visited some of his brother officers of the out-door Customs staff, and exactly 16 days after, one of these had the usual symptoms of the disease, including lumbar pain, with a temperature of 104°. It became necessary, therefore, to remove this latter from the out-door staff general quarters, and having no other suitable quarters, he was placed with his recent visitor, who had doubtless communicated to him the disease. When the eruption was due, none appeared except one questionable spot on the trunk, pyrexia subsided, and slight pleurisy was the only remaining trouble, which cleared up in three days. Taking into consideration the well-marked premonitory stage and the exposure to infection (if not already infected) from companionship with a patient in an infectious condition, there can be little doubt that this latter case was one of variola sine eruptione. Patient had vaccination marks, but had not been vaccinated since childhood.

Five cases of pneumonia occurred. Two of these were adults, and three children. Four cases of acute bronchitis in children were observed, and of these one was fatal.

There had been several attacks, and in the last nature yielded, the lungs being already unable to perform their functions from previous repeated attacks.

Two cases of remittent fever came under notice, one of these proved specially persistent. Three cases of acute dysentery yielded to treatment, as well as several of diarrhoea—none of a severe character. One case of acute rheumatism recovered well. The first case of typhus fever which came under my observation was from H B M S *Pegasus*.

The junior medical officer was removed from his ship and placed under my care, with a temperature of 105°. Next morning the characteristic rash was visible. The temperature reached 105° 5, and the heart's action was very feeble, and there was marked blood stasis at the periphery. Repeated doses of whiskey had the usual good effect, and tepid sponging proved invaluable in reducing temperature. After the crisis the patient was for seven days unable to evacuate either the bladder or rectum, but regained the needed power just in time to prevent any trouble from the constant use of the catheter. Ultimately there was complete recovery.

There was a fatal case of typhus on board the *Pegasus* while she was here, which I did not see, and subsequently there were other cases developed after the ship removed to Shanghai. The commander was attacked by confluent small-pox, which ended fatally in Shanghai. I made inquiries amongst the people as well as amongst the mandarins as to the origin of the typhus epidemic, and the information elicited confirms my impression that the disease arose on the north of the Yangtze, where there is greater poverty than here, and a continuance of dry weather for several months had increased this condition. The *Pegasus* was anchored near a small native town where there were several deaths from fever, and the prevailing winds were from the quarter where the town was situated. Since last January several cases of typhus fever have been reported, and invariably these have come from the north, or have contracted the disease from some one who has brought the infection across from that quarter. Happily, even there the disease is much less prevalent, and here we have had only one case amongst the foreign community (April 1881). A second death ashore occurred from arachnitis.

The patient was a syphilitic of many years standing, and had constantly suffered from tertiary manifestations. His last was under treatment 10 days before it proved fatal, and steadily induced general

paralysis, although now and again it seemed to yield to the action of iodide and bromide of potassium. The autopsy revealed the usual condition of this disease.

Practice amongst the Chinese, in the majority of serious cases, was of a surgical nature. Several cases of gangrene of the lower extremities presented themselves, and in two cases double amputation was demanded.

The left half of the inferior maxilla was removed for a large fibrous tumour. The operation was rendered more troublesome than usual on account of an attempt having been previously made to remove a portion with a brass knife and caustic, which caused the buccal mucous surface to adhere to the tumour, and the hæmorrhage from the dissected surface made it necessary to desist now and then from the operation and apply pressure. There was very little deformity observable after recovery.

The subclavian artery was tied in its third part for a diffused aneurism in the axilla bulging up to the clavicle. While the patient was under observation for four days the tumour had appreciably extended and was threatening to rupture. Owing to thickening of the parts and several enlarged glands there was some delay in finding the vessel, but it was finally secured, and the patient did well for the first 24 hours. The second day he complained of uneasiness over the region of the heart, the action of which was feeble and rapid. About 56 hours after the operation the patient raised himself to go to stool, contrary to orders, and died suddenly. Of course no postmortem was allowed.

Three cases of epithelioma of the penis were operated on, but one of these has presented himself (15 months after) with a recurrence of the disease.

CHINA.

IMPERIAL MARITIME CUSTOMS.

II.—SPECIAL SERIES: No. 2.

MEDICAL REPORTS,

FOR THE HALF-YEAR ENDED 30TH SEPTEMBER 1881

22nd Issue.

PUBLISHED BY ORDER OF

The Inspector General of Customs.

SHANGHAI
STATISTICAL DEPARTMENT
OF THE
INSPECTORATE GENERAL

MDCCCLXXXII

INSPECTOR GENERAL'S CIRCULAR No 19 OF 1870

INSPECTORATE GENERAL OF CUSTOMS,
PEKING, 31st December 1870

SIR,

1—It has been suggested to me that it would be well to take advantage of the circumstances in which the Customs Establishment is placed, to procure information with regard to disease amongst foreigners and natives in China, and I have, in consequence, come to the resolution of publishing half-yearly in collected form all that may be obtainable. If carried out to the extent hoped for, the scheme may prove highly useful to the medical profession both in China and at home, and to the public generally. I therefore look with confidence to the co-operation of the Customs Medical Officer at your port, and rely on his assisting me in this matter by framing a half-yearly report containing the result of his observations at upon the local peculiarities of disease, and upon diseases rarely or never encountered out of China. The facts brought forward and the opinions expressed will be arranged and published either with or without the name of the physician responsible for them, just as he may desire.

2—The suggestions of the Customs Medical Officers at the various ports as to the points which it would be well to have especially elucidated, will be of great value in the framing of a form which will save trouble to those members of the Medical profession, whether connected with the Customs or not, who will join in carrying out the plan proposed. Meanwhile I would particularly invite attention to—

a—The general health of during the period reported on, the death rate amongst foreigners, and, as far as possible, a classification of the causes of death.

b—Diseases prevalent at

c—General type of disease, peculiarities and complications encountered, special treatment demanded.

d—Relation of disease to $\left\{ \begin{array}{l} \text{Season} \\ \text{Alteration in local conditions—such as drainage, \&c} \\ \text{Alteration in climatic conditions} \end{array} \right.$

e—Peculiar diseases, especially leprosy.

f—Epidemics $\left\{ \begin{array}{l} \text{Absence or presence} \\ \text{Causes} \\ \text{Course and treatment} \\ \text{Fatality} \end{array} \right.$

Other points, of a general or special kind, will naturally suggest themselves to medical men, what I have above called attention to will serve to fix the general scope of the undertaking. I have committed to Dr ALEX JAMIESON, of Shanghai, the charge of arranging the Reports for publication, so that they may be made available in a convenient form.

3—Considering the number of places at which the Customs Inspectorate has established offices, the thousands of miles north and south and east and west over which these offices are scattered, the varieties of climate, and the peculiar conditions to which, under such different circumstances, life and health are subjected, I believe the Inspectorate, aided by its Medical Officers, can do good service in the general interest in the direction indicated, and, as already stated, I rely with confidence on the support and assistance of the Medical Officer at each port in the furtherance and perfecting of this scheme. You will hand a copy of this Circular to Dr _____, and request him, in my name, to hand to you in future, for transmission to myself, half-yearly Reports of the kind required, for the half-years ending 31st March and 30th September—that is, for the Winter and Summer seasons

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I am, &c,

(signed)

ROBERT HART,

I G

THE COMMISSIONERS OF CUSTOMS,—*Newchwang, Ningpo,*
Tientsin, Foochow,
Chefoo, Tamsun,
Hankow, Takow,
Kuukiang, Amoy,
Chunkiang, Swatow, and
Shanghai, Canton

SHANGHAI, *1st March 1882*

SIR,

IN accordance with the directions of your Despatch No 6 A (Returns Series) of the 24th June 1871, I now forward to the Statistical Department of the Inspectorate General of Customs, the following documents —

Report on the Health of Amoy, pp 1-3,

Report on the Health of Swatow, pp 4, 5,

Report on the Health of Hoihow, pp 6-10,

Report on the Health of Chefoo, pp 11, 12,

Report on the Health of Ningpo, p 13,

Report on the Health of Wênchow, pp 14-50,

Report on the Health of Shanghai, pp 51-54, each of these referring to the half-year ended 30th September 1881

Special articles on—

Distoma Ringeri and Parasitical Hæmoptysis, pp 55-62

The Periodicity of Filarial Migrations to and from the Circulation, pp 63-68

An Appendix of translations and notes relating to recent pathological investigations, which are of special interest to medical practitioners in China, pp 69-104

I have the honour to be,

SIR,

Your obedient Servant,

R ALEX JAMIESON

THE INSPECTOR GENERAL OF CUSTOMS,
PEKING

The Contributors to this Volume are —

P MANSON, M D, CH M	Amoy
J POLLOCK, L K & Q C P, L R C S I	Swatow
E A ALDRIDGE, L K & Q C P	Hoihow
J G BRERETON, L K & Q C P, L R C S I	Chefoo
W A HENDERSON, L R C P Ed	Ningpo
D J MACGOWAN, M D	Wenchow
R A JAMIESON, M A, M D, M R C S	Shanghai

For everything enclosed within square brackets [], the Compiler is responsible

Dr P MANSON'S Report on the Health of Amoy for the Half-year
ended 30th September 1881

THERE has been no epidemic either among foreigners or natives, and the general health of the community during the six months has been good

The deaths were as follows —

1 Resident (for two months)	Aneurism of the aorta
2 Sailor	Valvular disease of the heart
3 „	Aneurism of the aorta
4 „	Valvular disease of the heart
5 Child, resident (eight months)	Diarrhoea and fever

The first four cases acquired their diseases elsewhere, the last is the only one attributable to Amoy. Another might be added, but as it will probably appear in the Shanghai returns I omit it here. The cause of death, dysentery and secondary multiple abscess of the liver, originated in Amoy.

Aneurism of the Ascending Aorta—The first case of aneurism occurred in the Customs out-door staff, and had but lately (29th March) arrived from Hankow.

Some weeks after his arrival he consulted me about a chronic irritation of the fauces which had troubled him for about two years, and for which he had been trying a variety of local applications. He also complained of slight attacks of what he called asthma, coming on especially at night, and some breathlessness experienced on going upstairs. I failed to detect any disease in his throat, and repeatedly examined his chest, with the possibility of aneurism present to my mind, but could detect no objective symptoms whatever. * On 22nd May, feeling perfectly well, he went out riding with some friends. He had ridden but a little way, and got about 100 yards in advance of his party, when he was seen suddenly to drop from the saddle and fall on his face in the sand. He breathed heavily, his face became black, and in a few minutes he died.

A postmortem examination was made about four hours after death. The pericardium was distended with blood clot and serum. An aneurism—sacculated, and with a large opening into the artery

* As a result of a good many years' experience and more than one unpleasant surprise, I have formulated for myself two rules which I can confidently commend to anyone commencing practice among foreigners in China.

1st Given a *non febrile* case in which persistent symptoms—no matter how trifling—point to disease in the chest (especially if there is laryngeal irritation), and the cause for which cannot be readily made out, suspect aneurism of the aorta, and carefully and repeatedly examine for this.

2nd Given a *febrile* case of some standing in which symptoms—no matter how trifling—point to disease in the abdomen, the exact nature of which cannot readily be diagnosed, suspect abscess of the liver, and carefully and repeatedly examine for this.

Those who have practised in China for any length of time become thoroughly impressed with the extreme frequency of aneurism of the aorta and abscess of the liver among foreigners, and hardly ever approach the diagnosis of an obscure case without being on their guard about these two diseases. But, unless impressed by some such rule as I have formulated, the novice, with only European experience to guide, or rather mislead him, is very apt to overlook these important possibilities, and may have them afterwards very unpleasantly impressed on him. A pulsating tumour bulging out from the thorax, or a fluctuating swelling in the region of the liver are easily recognised and diagnosed, but it is seldom indeed, unless when disease has advanced so far that treatment has become entirely hopeless, that the aneurism or the abscess declares itself so openly.

extending from the semilunar valves nearly as far as the origin of the innominate—had burst into the pericardium by a minute rent behind the appendix of the right auricle. The aneurism—about the size of a small orange—sprang from the lower and back part of the artery, and pressed slightly on the trachea just above its bifurcation, but had caused no erosion or ulceration. There were many patches of atheroma along the aorta, these could easily be turned out with the finger-nail after stripping off the inner coat. The patches increased in number, size and degree of degeneration, in proportion to their nearness to the aneurism. The inner surface of this was rough and irregular from atheromatous deposits, some of which were much eroded, and in their ragged, ulcerated-looking centres presented a dark red staining. In some places this process had so weakened the walls of the tumour that small subsidiary aneurisms had formed—little pouches with narrow openings hardly admitting the tip of the little finger. There were at least three such baby aneurisms, two of them adherent to the auricle or pericardium. The rent in the wall of the aneurism was very small, but, besides that which had caused death, there was a second, much more extensive, not, however, penetrating all the walls of the sac, but dissecting them up to a considerable extent. There were no laminated coagula, nor, beyond a certain amount of thickening in the tissues around the tumour, any attempt at spontaneous cure. The origin of the innominate was barely involved. The heart was quite healthy, lungs somewhat emphysematous, liver large and full of blood. The dissection proceeded no further.

This man, though considerably over 40, was active, in good general health, very temperate, and he told me he had never had syphilis.

Aneurism of the Transverse Aorta—A sailor, aged about 31, active, muscular, and temperate, consulted me early in March about a cough that had troubled him for some time. He said he caught a bad cold early in January, that towards the end of that month, once or twice, when exerting himself, his wind failed him, that during February he had several similar attacks of breathlessness, that previously he had been treated for specific disease—had had nitis, some periostitis about the sternum and ribs, and that last year he suffered much from pruns in the head and rheumatism. Just before my examination he had been walking up rather a steep road, and I observed that his breathing was much oppressed. There was no expectoration with the cough. Examination failed to elicit any distinct sign of thoracic disease, although, owing to my suspicion of aneurism, this was made with the greatest care. I saw him again about a week later, and then heard for the first time a distinct, soft, systolic bruit over the second and third intercostal spaces, just to the left of the sternum. At the beginning of April I saw him again. He told me that he had had several very severe attacks of dyspnoea while at sea, and had been much troubled at times with paroxysms of coughing, unaccompanied by expectoration. It was possible now to diagnose thoracic tumour, probably an aneurism. Pressure symptoms had developed, he had difficulty in swallowing, prun behind left shoulder, a husky raucous voice and breathing. Slight dulness on percussion could be made out over the second left cartilage, bruit was audible here also, and could be traced along the course of the vessel, and could also be made out posteriorly. There was a slight heaving movement of the sternal end of the left clavicle and one or two of the upper ribs, and in addition to these symptoms the breath sounds of the left lung were decidedly feebler than those of the right.

He was sent to bed and kept as much as possible in the recumbent position. His food was restricted, and only a very small allowance of fluid permitted, and iodide of potassium, in doses rapidly increased to a drachm, was taken three times a day. Great relief followed this treatment. By the middle of June cough had entirely ceased, the difficulty in swallowing, and pain in the shoulder had disappeared, and the heaving at the sternal end of the left clavicle could hardly be detected. Before this, however, he had hawked up on three or four successive mornings small quantities of rusty bloody mucus. He was so well that arrangements were made to send him home, with the view of continuing the treatment there among his relatives. But 10 days before his death a severe attack of coughing was brought on by a piece of bread "going the wrong way," and next day I observed that throbbing and heaving had returned. Three days afterwards his voice became very husky, and he had an alarming attack of orthopnoea. These

attacks recurring frequently, and provoked by the slightest movement, as even by swallowing, brought about his death by exhaustion on the 2nd July

At a postmortem examination, an aneurism the size of a goose's egg, with an orifice the size of half a crown, was discovered springing from the under and back part of the distal half of the transverse aorta. The orifices of the innominate and left carotid and subclavian were not involved. The walls of the aneurism were strengthened everywhere by an extensive deposit of laminated dirty yellow fibrine, which could be peeled off in long strips, and was intimately connected with the vessel. In some places it was quite three-quarters of an inch in thickness. Its inner surface was very irregular, and stained with blood. Half an inch above the bifurcation an aneurismal mamilla projected into the lumen of the trachea. The little tumour appeared to be covered by mucous membrane only. It was rough, blood-stained, and looked as if on the point of rupture. There was some fibrine strengthening it, but this appeared to be the weakest point in all the aneurism. About three-quarters of an inch above this mamilla was another but smaller projection the size of a B B shot, its surface was smooth and much healthier looking than the other. There was great abundance of atheroma in the arch of the aorta. The lungs were healthy. None of the other viscera were examined.

Notwithstanding the fatal issue of this case, the rapid amelioration of symptoms and the extensive deposit of fibrine have impressed me very favourably with the iodide of potassium treatment of aneurism.

Dr J POLLOCK'S Report on the Health of Swatow for the Half-year
ended 30th September 1881

I AM indebted to Mr Harbour Master RAE for the following meteorological observations —

ABSTRACT from METEOROLOGICAL TABLE

MONTH	WINDS					MERCURIAL BAROMETER				THERMOMETER						RAIN AND FOG			TIDES	
	Number of Days N to E	Number of Days E to S	Number of Days S to W	Number of Days W to N	Number of Days Calm.	Highest by Day	Lowest by Day	Highest by Night	Lowest by Night	Highest by Day	Lowest by Day	Highest by Night	Lowest by Night	Average Wet Bulb	Average Dry Bulb	Number of Days Rain	Number of Inches Rainfall	Number of Days Fog	Average Rise, Spring Tides	Average Rise, Neap Tides
	D h	D h	D h	D h	D h	Inch	Inch	Inch	Inch	°	°	°	°	°	°	D h	Inch	D h	Ft in	Ft in
April	10 8	11 4	1 20	1 4	5 12	30 30	30 00	30 30	30 00	80	62	79	54	65	70	3 12	3 165	2 12	7 0	6 3
May	11 0	10 20	4 4	4 4	4 20	30 30	29 91	30 30	29 90	89	65	82	68	75	80	3 6	2 405	0 4	7 6	4 6
June	2 12	10 20	11 0	0 16	5 0	30 07	29 83	30 95	29 80	87	72	89	72	80	85	1 3	3 720		7 3	6 0
July	4 16	17 14	3 12		5 6	29 92	29 86	29 89	29 84	85	84	83	82	80	83	2 20	5 072	6	6 8	5 7
August	4 13	12 7	8 9	2 2	3 17	29 87	29 70	29 84	29 70	87	84	83	82	82	84	3 3	4 005		6 3	5 6
September	5 16	14 0	2 4	3 16	4 12	30 13	29 48	30 10	29 48	94	79	88	78	80	82	1 8	1 001	0 1	6 9	5 6

Note—Tides very irregular, not to be depended on, being greatly influenced by the winds.

Among foreign residents there have been no cases of peculiar interest since I arrived in November last, with the exception of a well-marked case of diphtheria occurring in a child aged 5 years. My colleague, Dr E I SCOTT, saw the case with me, and concurred in the diagnosis.

The treatment consisted in brushing the affected parts with glycerine of tannic acid regularly every hour, inhalations of steam, poultices, and internally quinine and iron. I tried for a short time a solution of chloral in glycerine, but the result was not at all so satisfactory as the glycerine of tannin, the membrane not appearing either to be dissolved or detached to an appreciable extent by it.

The child eventually recovered, and, under a course of cod-liver oil, regained his usual health. His mother was attacked with tonsillitis while nursing him, and I myself had an ulcer on my right tonsil. The other children of the house, which is situated in a bad locality, were sent to Double Island, where they remained till all likelihood of infection had ceased.

There has been one case of typhoid fever in a child aged 7, and a rather severe case of continued fever in a child aged 2 years, both of which made uninterrupted recoveries.

At Double Island an outbreak of varicella occurred among the resident children, seven of whom were attacked. The eruption was copious, and there was very little constitutional disturbance. All became quickly convalescent.

Among the other cases were dysentery, delirium tremens, complicated with cirrhosis of the liver—one case of each. There was one death among the residents, from chronic tuberculosis of lung and intestine.

Four births have taken place, all natural, with one exception, where the placenta was retained, necessitating extraction. This last patient had a very foetid, purulent discharge, slight rigors, and quick pulse, but, under quinine and iron internally, and frequent carbolic injections, I am happy to say made a good, though tedious, recovery.

In the Swatow Seamen's Hospital a case of hepatic abscess terminated fatally, aspiration was performed, but the patient, who was a young engineer of temperate habits, was already moribund on admission.

The European lightkeeper from the Lamocks station arrived in harbour one evening perfectly unconscious, with temperature 105°, physical signs of broncho-pneumonia, phimosis, and retention of urine. He died a few hours after admission to hospital. His illness was described as having commenced 10 days before with "fever," followed by low delirium.

A coloured seaman was admitted, who had been stabbed in the back and head during an affray with drunken sailors. When I saw him, shortly after the receipt of his injuries, he had an incised wound over the right parietal bone, and a punctured wound, about 3 inches long, immediately below the inferior angle of the left scapula, through which air bubbled at each respiratory movement. As the wound looked perfectly clean, I put three carbolic sutures in, and hermetically sealed it with lint steeped in compound tincture of benzoin, and on the removal of the lint five days after, I found the wound closed. The patient had a slight attack of pleuritis, but in a fortnight was convalescent.

The cook of a steamer, a Chinaman, was admitted for dropsy of the abdomen, which was enormously swollen, and respiration greatly impeded. No measurements were taken. Paracentesis abdominis was performed, and 284 ounces of blood-stained fluid was evacuated. The patient recovered sufficiently to proceed to Hongkong, to rejoin his family.

Dr E A ALDRIDGE's Report on the Health of Hoihow for the Half-year
ended 30th September 1881

THE health of the small foreign community resident here has during the last six months been very good. There have been two or three cases of very acute diarrhœa, but under active treatment this complaint was always promptly checked. All other affections were of a trivial character. That diarrhœa has not been more prevalent, considering how common this complaint has been among the native population, may be somewhat due to the sensible view taken of the precautionary measures suggested by myself, and the trouble taken in order to carry them out. The summer has been very long and trying. Since April, except on two or three occasions, the thermometer has never registered below 82°. So long as foreigners here live in Chinese-built houses, and the breeze that is usually blowing is kept off by their houses being surrounded by others, they will find at the end of every summer that their constitutions have been enfeebled by excessive perspirations, sleepless nights, etc. Were they, however, to live in detached houses built on elevated ground, I feel sure that a summer's residence here would be little more trying to the constitution than in other ports in China.

As soon as I found that cholera had broken out here, I informed the foreign residents of the precautions it would be advisable for them to take. Of these the more important were that water should not be drunk without having been previously boiled and filtered, and even when so treated should not be drunk after standing more than 24 hours, and that it was a mistaken idea to suppose that water, by being diluted with wine or spirit, without being previously boiled and filtered, was rendered harmless. I advised that a broad thick flannel belt, even if not worn in the daytime, should always be worn at night, while the sleeping clothes should be made of flannel, that exposure to night air should be avoided, and therefore sleeping on the verandahs abandoned, and that care should be observed in diet, shell-fish and fruit being forbidden. I advised, in addition, that a bucket of carbolic acid and water should be placed in each bathroom, for the purpose of disinfecting all excreta, which should then be quickly removed, while the drains should be frequently flushed with carbolic acid solution. I warned them against the premonitory painless diarrhœa, against the amateur use of purgatives, against exposure to the sun and to the emanations from the narrow streets. I further asked them to impress my recommendations upon the minds of their native servants, and advised that should any of these latter complain of diarrhœa, vomiting, or of any other sickness, they should at once be removed. It will be noticed that I recommended the residents to walk as little as possible along the streets. Not to do so at all was quite an impossibility, situated as the houses are, the front entrance to all of them being from a Chinese street. During the last few months, if business did not compel one to leave the house, it became a question whether one should remain in-doors and forego the pleasure of taking any out-door exercise, or experience the unpleasantness of having to walk along streets where the pestilential odours emanating from the drains and the refuse thrown from the houses must have greatly favoured the spreading of a disease such as

cholera This condition of the streets was greatly aggravated at the time of the Yu Lan (All Souls) festival by an increase in the number of fruit and vegetable sellers lining the streets, who, owing to a great influx of strangers into Hoihow, seemed to do a good business, but instead of then taking the trouble to remove the fruit and vegetables as soon as they became unfit to eat, and hence unsaleable, they threw them into the gutters and let them rot there

There were three or four cases of heat apoplexy and a case of intermittent fever on board H BMS *Magpie* during her stay here, but there were no deaths The French gun-vessel *Parceval* arrived here from Haiphong with a mild case of typhoid fever, the man was not landed With reference to the diseases that have occurred among the native population in Hoihow during the period under review, the most important thing that I have to report is that there has been an epidemic of Asiatic cholera In the middle of July a steamer direct from Bangkok, where cholera was at the time prevalent, arrived here and landed 270 passengers Soon after I was informed by the Chinese that several natives were dying of a disease which they believed to be cholera, and this information was subsequently confirmed by myself Though no information was given to anyone here of the fact, the newspapers reported that two deaths had occurred on board from cholera during the voyage, and as cholera showed itself near Pochin, where several of the passengers went to reside, the presumption is that cholera was brought to the island by the passengers conveyed here by the steamer from Bangkok above referred to Though I feel sure that there had been several deaths from Asiatic cholera previous to the 8th August, it was not until that date that I was called in to see any well-marked case and was able to speak with certainty as to the nature of the epidemic

At 4 o'clock in the afternoon of the 8th August I visited a woman, aged 46, who up to 1 P M had been in good health, at which time she first complained of pain in the abdomen, which was followed by vomiting, diarrhoea, and cramp in the legs I found her lying on the ground, speechless, she was, however, quite conscious, and made motions with her hands for me to give her something The surface was cold, the eyes shrunken, cheeks hollow, lips and nails blue, skin at tips of fingers shrivelled, colour of body dark, pulse imperceptible at wrist, and could only be feebly felt at the carotids, temperature 95°, the breath was very cold, there had been 15 motions, principally composed of large quantities of fluid, in which were floating numerous white flocculi The patient died at 6 o'clock, five hours from the onset of symptoms

Though the cases I saw afterwards differed little from this, I report this as being most typical of the disease

On the same day that I saw the above case I found one of the Custom House coolies in a state of semi collapse, he was much emaciated, and when questioned answered with a feeble voice He complained of headache and great thirst, there was abdominal pain and retraction of the abdomen, pulse feeble, temperature 97°, conjunctivæ yellow I was informed that the diarrhoea and vomiting which were present when I saw him had commenced two days previous, the motions were of a very watery character Upon visiting him the following day the pulse was 68, temperature 97° 2, the vomiting had been checked by dilute hydrocyanic acid, and the diarrhoea by astringents Two days after this his temperature was normal, and he made a good recovery When first taken ill this man was suffering from mumps

To give an idea of how quickly fatal the disease was in some cases, I may state that within 24 hours three persons in one house died a boy, 7 years old, in 4 hours after the first symptoms, a man, aged 30, in 6 hours, and a woman, aged 25, in 5 hours The day after, I saw another woman in the same house who was attacked with diarrhoea, she, however, recovered.

Upon making inquiries I found that the water these people had been in the habit of drinking was obtained from a well situated alongside the drains of one of the main streets. As stated in my last Report, water fit for drinking cannot be obtained in Hoihow, but though this is so, many of the Chinese prefer to drink the foul water close to their houses, rather than take the trouble of bringing drinking water from the springs a short distance from the town. Considering the way the natives here neglect the most simple sanitary precautions, it is not to be wondered at that a disease like cholera should spread among them, in fact, I think it is surprising that the ravages of this epidemic have not been of a more serious character. I found that most of those who died had obtained their drinking water from wells situated either in their yards or within a short distance of the street drains, I also heard that the disease proved fatal to many who had over-fatigued themselves by being up most of the night, sitting or standing, exposed to the night air in front of the Chinese theatres, and who had afterwards returned home, and after drinking large quantities of water and eaten unripe fruit, such as pineapple and water-melon, had then gone to sleep in the open air, only scantily clad. I cannot say that I found diarrhoea a symptom that could guide one in giving a favourable or unfavourable prognosis, though the motions were in fatal cases mostly very numerous, I found that this was not always so, death in some cases taking place after only two or three.

H B M's Consul, upon receiving information from me that Asiatic cholera had shown itself here, reported the circumstance to the Hongkong Government. The epidemic here was, however, not considered of sufficiently serious a character to require the subjection to quarantine of vessels arriving from this port, though I believe vessels from Bangkok were for a short time quarantined.

The filthy condition of the town was brought under the notice of the Taotai, who issued a proclamation ordering the natives to clean their streets and not to let them get into the same condition again, he also instructed the police to go round and see that his orders were obeyed. In addition to the recommendations that I issued to the foreign residents, I warned the Chinese against drinking the Hoihow well water, and advised that during the epidemic the excreta should not be used to manure the fields, as is usually done, but that they should be buried. I further suggested that as earth acts somewhat as a deodoriser, they should keep some in their houses and put some in the buckets after use, also, that should a death occur, the corpse should be buried as quickly as possible.

I have been unable to obtain any accurate information respecting the mortality from cholera, as the authorities do not keep any returns. I am, however, informed that there have been about 400 deaths from this cause. The population of Hoihow is estimated at about 12,000, so that giving 10 as the average number of persons to each house, though this is probably under the mark, it may be said that there has been on an average one death from cholera in every third house. It is worthy of remark that only one death from cholera occurred among the numerous Cantonese residents, whose mode of living is more cleanly than that of the natives. They do not eat so much unripe fruit, and are more particular respecting the place from which they obtain their drinking water. During the epidemic, diarrhoea and vomiting were prevalent, the diarrhoea being peculiar not only on account of its very watery character, but also because of the great prostration it quickly caused. After trying different astringents, I came to

the opinion that sulphuric acid and opium gave the best results, and I believe that it is not improbable that some of these cases might have run into cholera had they not been so treated. In August another vessel arrived with passengers from Bangkok, but on boarding her I found that there had been no sickness during the voyage. Cholera spread from here to Kiungchow, but its course there was very mild. The average number of deaths per diem here was about 10, this number gradually decreased during September, and at the latter end of that month the deaths from cholera were only about three daily.

During June and July I noticed many cases of mumps among the Chinese, adults as well as children being attacked.

I have attended two persons suffering from the effects of snake-bite, the bites in both cases being inflicted by the bamboo snake. These snakes are very common in this neighbourhood, and on account of their green colour are often trodden on by the natives, who walk through the grass without shoes.

In one case a man was bitten on the ankle. He came to me 12 hours afterwards, he was very feverish, and complained of pain extending up the leg and thigh. There was an œdematous swelling reaching to the knee, and the skin over the foot was tense, he was unable to straighten the leg. I made a crucial incision over the bite, applied hot fomentations to the foot and leg, and kept him in bed, but it was four days before he was able to return to work.

This man immediately after being bitten had taken a large quantity of Chinese wine. I hear that to become intoxicated is considered the best line of treatment that can be adopted in cases of snake-bite.

The other case I saw was very similar to the first, a woman was bitten on one of the toes, and the virus produced the same results. I made a crucial incision over the bite, applied nitrate of silver and then hot fomentations, with a favourable result.

The new Taotai that arrived at Kiungchow in April died two months afterwards, his death, I believe, being from exhaustion, the result of diarrhoea and hæmorrhoids. I heard that seven native doctors were called in to attend him, and that they were all afraid to administer any of their drugs, fearing lest his death should take place at the time he was under their treatment.

In July a passenger-boat left this port for Hainan, a place on the mainland about 12 miles from here, with 28 Chinamen, among whom were 10 pirates, who soon after leaving here rose and murdered all the passengers, except a man and boy, who escaped overboard. The pirates then took possession of the junk, the cargo of which was worth about \$12,000. The man and boy that escaped were picked up by fishing-boats. Hearing that the man had been injured, I visited him, and found that he had received a stab in the anterior axillary fold. The wound was not a deep one, but there was a great deal of areolar inflammation extending down the side and front of the chest, this cellulitis was probably increased by the exposure of the wound to the action of the salt water. Hot fomentations reduced the inflammation, and in a week he was quite well.

I have been called upon to attend one Chinese woman, a primipara, in labour. The case having proved very protracted, the friends became alarmed. No operative interference was, however, required, and the woman made a good recovery. From Chinese sources I learn that it is a most unusual thing to hear of a bad midwifery case in this part of the island.

I have heard nothing since April of the epizootic that caused so much havoc among the cattle previous to that time, so I suppose that it has died out

During the first three months under review we had some very violent thunderstorms, which usually took place between the hours of 2 and 4 P.M., with heavy rain and vivid lightning. I heard of two or three persons having been killed by lightning. During the last six months I consider that the temperature has averaged about 85°. In July we had two gales and in August one, but so far this year we have not experienced any typhoons, the lowest reading of the barometer was 29.63, which was recorded during a S.E. gale. During the last twelve months the wind has blown from N to E on 230 days, from E to S on 63 days, from S to W on 13 days, and from W to N on 30 days. Thus it will be observed that only on 76 days has there been any southerly direction in the wind, while during 260 days there has been a northerly direction. This fact proves how little we are affected by the south-west monsoon, and that the wind here is of more or less local origin during these months. If the south-west monsoon affected us, we should feel the heat a great deal more than we now do, and the place would not be so healthy, for the south-west wind, before reaching us, must blow over the island, while the northerly wind we have so often is essentially a sea breeze, having never to blow over more than a very small stretch of land before arriving here. Rain has fallen on 77 days, 55 of which have been during the last six months, the rain we have had has usually attended a thunderstorm, and has rarely lasted above an hour or two a day. The water in the river opposite the Custom House has on an average been 1 foot 8 inches higher from the beginning of July to the end of December than during the other half of the year.

The following meteorological table is drawn up from readings taken at the Custom House. Judging from the thermometers several foreign residents keep in their houses, by adding 2° or 3° to the readings given below, a more accurate idea of the temperature experienced by them would be arrived at —

MONTH	WINDS							BAROMETER		THERMO- METER		No of Days Fog	No of Days Rain	AVERAGE RISE AND FALL OF TIDES	
	No of Days N to E	No of Days E to S	No of Days S to W	No of Days W to N	No of Days Variable	No of Days Calm	Average Hourly Force	Highest and Average Highest	Lowest and Average Lowest	Highest and Average Highest	Lowest and Average Lowest			Highest	Lowest
							Miles	Inch	Inch	°	°			Ft in	Ft in
April	10	15	2		3		3	30.20 29.98	29.75 29.81	93 84	67 76		10	4 0	3 6
May	14	10		1	6		2	30.15 29.98	29.72 29.86	95 85	74 81		7	4 6	4 0
June	15	11		1	3		3	29.95 29.88	29.71 29.83	95 90	76 81		13	5 0	4 6
July	11	4	4	5	7		3	29.90 29.80	29.63 29.78	87 84	79 82		8	5 6	5 0
August	6	5	6	10	4		2	29.93 29.83	29.84 29.78	88 85	79 82	1	14	6 6	6 0
September	17	3		8	2		4	30.05 29.91	29.70 29.80	86 84	79 81		3	7 0	6 6

Dr J G BRERETON'S Report on the Health of Chefoo for the Half-year
ended 30th September 1881

FOR the following meteorological table I am indebted to Mr JENNINGS, Harbour Master —

MONTH	1880			1881		
	Highest	Lowest	Average	Highest	Lowest	Average
	°	°	°	°	°	°
April	85	29	57	74	30	52
May	94	42	68	90	41	52
June	89	54	72	100	58	79
July	94	60	77	106	62	84
August	99	62	80	104	62	83
September	93	50	72	88	57	72

It will be seen that the heat has been greater this summer than during the corresponding period last year. We have also had a considerable increase in the number of cases of illness, and I have to record a very high death rate. The diseases treated during June and July were mostly cases of intestinal disorder, but these soon yielded to treatment, except in two instances which proved fatal.

The causes of death were as follow —

- | | |
|-----------------------|-------------------------|
| 1 Irritation | 5 Meningitis —Dentition |
| 2 Infantile diarrhoea | 6 " " |
| 3 Gastritis | 7 Peritonitis |
| 4 Diarrhoea | 8 Aneurism of aorta |

of these, however, three were visitors

The case of *aortic aneurism* which terminated fatally had been under treatment for about 2½ years

Previous to this for about a year, complaint had occasionally been made of "rheumatism" in the right shoulder, to relieve which various anodyne applications and blisters were employed, but none gave more than temporary relief. The pain then extended down the arm, and under the right scapula. The chest and back were carefully examined, but nothing definite could be made out, till about 18 months prior to death, when the nature of the disease became more apparent. The signs of aneurism then were, circumscribed dulness on percussion at right side of sternum and also second area of pulsation at costal cartilages of third and fourth right ribs. Up to this time there had been no hæmoptysis or cough, and only very slight dyspnœa upon exertion. Aneurism then being diagnosed, he was put upon the iodide and bromide of potassium with ergot, which was continued for about six months, gradually increasing the doses of each ingredient. Symptoms of softening of the brain then set in. Having replaced the bromide of potassium

by chloride of barium, a drug recommended by a writer in the *Practitioner*, I found after 10 days that it was not only useless, but that the chest pain always seemed intensified for some hours after each dose. Compound tincture of valerian was given with considerable benefit for about three weeks, when it lost its effect. Finally, hypodermic injections of morphia and atropia, separately and combined, had to be resorted to, these were continued up to the time of death. The immediate cause of death was rupture, the patient dying shortly after having coughed up about 6 ounces of blood.

At the autopsy, a portion of the sternum over the sac was found corroded, pericardium distended with fluid. The aneurism sprang from immediately above the semilunar valves, and occupied the right side of the ascending aorta as far as the innominate. The sac could easily contain an ordinary-sized orange, the wall was adherent to the lung on the same side. On opening the sac the portion of wall adherent to the lung was found ruptured, the opening being large enough to admit a dollar*. The interior of the sac did not contain the least trace of clot, the aorta was atheromatous.

Bullet Wound of Abdomen—A Chinaman was wounded by a revolver bullet, which entered the abdomen 2 inches above and to the right of the umbilicus, and made its exit in the lumbar region, at the superior margin of the right kidney. A bullet similar to that with which the wound was inflicted weighs 180 grains, is conical in shape, and measures two-thirds of an inch in height and five-twelfths of an inch in diameter of base.

When seen, about 12 hours after the injury, there was not much constitutional disturbance (temperature, 100°, pulse, 98), nor did any arise during the time he was under treatment. During the first few days a small quantity of blood was passed in the urine, but this soon disappeared.

The anterior wound was firmly healed in 20 days, but that in the back discharged a considerable amount of pus, and did not close until the 30th day.

* Aortic aneurism where the sac intrudes into the lung is rare. It was observed in 8 out of 85 cases collected by PEACOCK. A case is reported in the *Lancet*, 1881, II, 708.

D^r W A HENDERSON'S Report on the Health of Ningpo for the Half-year
ended 30th September 1881

THE hot season of 1881 has been extremely healthy for such a locality as Ningpo. One death occurred from a non-climatic cause, viz, granular kidney. In June and July the usual malarial fever appeared, but in August and September there was little of it. Diarrhoea also existed throughout these four months, principally, however, in July. Both affections yielded readily to treatment. In connexion with the excellent health of the community, it is interesting to observe the prevalence of sea breezes almost throughout the whole season, and the comparatively low temperature. During the four months the mean maximum was $81^{\circ}3$, and the minimum $72^{\circ}7$. As to the sea breezes, in June they were prevalent, in July they yielded to the southerly land wind, and in August and September they became dominant.

To Mr WALTERS of the Customs, I am indebted for the following

THERMOMETRIC RETURNS

YEAR AND MONTH		MEAN		MEAN, 9 A M		MEAN, 3 P M	
		Maximum	Minimum.	Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb
1880		°	°	°	°	°	°
October		72	64	68	64.1	71.8	65.8
November		59.8	46.5	50.9	46.5	58.9	50.2
December		47.7	36.8	41.6	38	47	41
1881							
January		49	35.2	40.9	36.8	48.5	40.6
February		53.5	42	46.3	42.7	50.9	46.3
March		50.7	39.7	45.3	41.8	50.1	44.4
April		65.2	56	60.2	57.1	64.2	59.6
May		71.8	62.5	66.7	64	70.4	66
June		78.9	71.3	76.3	72.9	78.9	74.4
July		86.6	77.3	84	77	86.2	80.4
August		86.5	78.5	84	79.2	86	79.4
September		79.1	72.2	74.8	72.9	79.9	74

Note.—Rain fell in the four months June, July, August and September, on 36 days.

Dr MACGOWAN'S Report on the Health of Wênchow for the Half-year
ended 30th September 1881

INASMUCH as the period of residence of foreigners at Wênchow scarcely numbers in the aggregate threescore years and ten, information touching the influence of the climate on their health is of insufficient importance to be placed on record, it is presumable that a degree of discursiveness in this Report will be pardonable

Reserving for another occasion the subject of medical topography, it will suffice to state that Wênchow is a departmental city containing a population of between 80,000 and 90,000, with tributary districts swelling that number to 500,000. It is situated 15 miles from the sea, on the right bank of the Pungcha or Ou* river, having its source in the mountains which separate the south-western corner of Chêhkiang province, the province of Fukien, near the source of the Tsientang and Min rivers, those mountains and those of the coast forming part of the Nanshan of RICHTHOFEN. The mountains, or hills rather, of the coast presented at no remote period, at their junction with the sea, a series of deep bays, which have become filled up by alluvial deposits forming a dead level to the very basis of the heights which the waters formerly laved, the hills rising abruptly from the valleys, and, where isolated, presenting the appearance of islands. What were once marshes now constitute a chief portion of the province for a great distance inland. This paludal region is begirt, except seaward, with pine-clad mountains, but has been long reclaimed, and is a very fertile rice country.

Owing to its oranographical surroundings, Wênchow has a greater number of rainy days and a greater rainfall than any port in the empire, *malgré* the deforestation, which here, as in the United States, does not seem to have had any hygrometric effect. It has a distinct rainy season, extending from the middle of May to September, and during the other months of the year rainy days are of frequent occurrence, nevertheless, for foreigners it is probably the healthiest portion of China. Its summer heat is mitigated by the rains and sea breezes, the thermometer seldom remaining long in the nineties, and in winter it rarely indicates the freezing point. A Northern invalid who has been over-stimulated by ozone, positive electricity, hydrogen superoxide in the air, or whatever causes peculiarity of climate north of the Yangtze, may here inhale an admirable alternative, while invalids from the South, who require a Northern winter, may here escape the Arctic blasts which in higher latitudes pierce him as if he were gossamer. In fine, Wênchow possesses the climate of Nice without a *mistral*. In summer the tourist may cruise among beautiful islands and fish to his heart's content, in winter he may scale Alpine heights of illimitable extent, not needing to traverse a plain between this and the "Roof of the World," and if endowed with requisite qualities, become a mighty hunter before the people, who here suffer from ravages by tigers, animals which are as troublesome here as they are under

* *Ou*, this is the name formerly applied to the entire region. It is now classical for Wenchow, etymologically, *Tuileries*

the equator or on the banks of the Amoor. Unfortunately, this port, so attractive to the invalid, is uninviting to patients, because for such there is no suitable accommodation. This is a delightful resort for those only who can "rough it."

An indication of the climate of Wëncchow is furnished by its flora. It is the northern limit of the bastard banyan (*Ficus pyrifolia*), but still maintaining its tropical magnificence, and the coir palm (*Chamærops excelsa*), which here attains its highest latitude as an industrial product, meet chestnuts and dwarf oaks of the North, and it is at this overlapping of zones that a peculiar species of orange flourishes, the well-known Wëncchow bitter orange, a delicious stomachic, fit to be designated the mild cinchona orange. The bitter principle is contained in the membrane which subdivides the pulp, the pulp itself is sweet.

This hasty glance represents the aspect of the region when in repose, but it is subject to floods from the mountains and cyclones from the ocean, storms that lay waste the fertile fields, and by their destructive agency occasion famine and pestilence. Records of these most violent of physical disturbances are to be found in local gazetteers, and as the phenomena are interesting to meteorology, I subjoin a list which comprises a period of over 15 centuries, and includes the maritime portions of Chêhkiang and part of Fukien. First, however, it is fit to premise a few explanatory remarks on the sources of that information.

Every province, every department, and almost every district in the Empire has a great pile of volumes which are denominated topographies, but as they relate to geography, public works, buildings and temples, physical phenomena, natural history, biography, manners and customs, matters fiscal and military, to annals and the like, "gazetteer" appears a more suitable term, although to some, "miscellanies" may seem preferable. The earlier records of these gazetteers are collated from general history and local traditions. At a later period, when local registers came to be kept at yamêns, these and the aid of scholars and families furnished the matter of which they are composed. It is not often, however, that the public archives are well kept, and the gentry, when they undertake to get up a new edition, are obliged to supplement material from their own records. A century or more will sometimes elapse between editions, and generally it will be found that the new ones have eliminated, as not worth perpetuating, information which foreigners—the statistician, for example—would greatly prize, a fact to be noted in connexion with the subjoined lists. Another explanation is requisite to the right comprehension of the tables. When facts on any subject are derived from a district gazetteer, they will be found more numerous than when they are furnished by the departmental or the provincial volumes. A list of epidemics, for instance, furnished by a district gazetteer will appear more formidable than when a departmental work has been drawn from. If defective, the records are never inaccurate, what are registered as facts were actual occurrences or appearances, although sometimes misinterpreted, as in cases of certain physical phenomena.

RECORD of STORMS, FLOODS, DROUGHTS and FAMINES in the Departments of Chuanchow, Foochow, Wênchow, and Ningpo, situated approximately between latitude N $24^{\circ} 40'$ and N $30^{\circ} 02'$, and longitude E $118^{\circ} 50'$ and E $121^{\circ} 22'$

Abbreviations—S W, storm wave, Ty, typhoon, St, storm, Fl, flood, Fa, famine, Dr, drought, Sp, spring, Su, summer, A., autumn

A.D	Moon	Chuan- chow	Foochow	Wênchow	Ningpo	A.D	Moon	Chuan- chow	Foochow	Wênchow	Ningpo	
291	4	St, S W		S W		1216			Dr		Dr	
293	6			St, S W		1217			FL		Dr	
304				Fa		1217			Ty			
480	4					1220						
648	8					1221			Fa		Dr	
663	7			S W		1222			Dr			
674	Sp			Fa.		1224			FL			
684	6			St, S W		1233			FL			
689	7			FL		1233						
768	A.			FL		1240			Dr		Dr	
783	6	S W	Dr	Dr								
784	8											
791												
797	4		FL	FL								
840				Dr								
841				Dr	Fa.							
984	8	S W										
1004		Ty										
1001	8		Ty									
1005	8	Ty										
1029		FL			Dr							
1066	8	St, FL										
1067	6	St, S W										
1093	A.		Dr, Fa									
1094			Fa.									
1101			Dr		FL							
1110			Dr									
1126				St								
1130	A											
1133	I		Fa., FL									
1134	9-10	St, FL	FL		S		3 Tides	St	FL	Fa, Dr	Fa	
1135	5		FL								Fa	
1149												St, S W
1150				Fa					Fa			Fa
1152				S								
1159				S								
1160	7		FL									S W
1163				Fa								S W
1165				Fa.					Fa			
1166	8-17			S W								S W
1171	5	Dr	FL			FL	FL		Ty			
1171	6		Dr			FL						
1174				Fa								
1178	5	FL		S								
1179	6	S		Dr								
1180	Su		FL				FL		Dr, Fa.			
1183				Dr								
1185				Dr		FL						
1188		Dr		Dr								
1189		FL										
1192	4	FL					S	Dr		Dr		
1195	A			Ty								
1195	A.			Fa.								
1203	6-7											
1205		Dr				Fa						
1210	I	FL								FL	S W.	

RECORD of STORMS, FLOODS, DROUGHTS and FAMINES—*continued*

A.D	Moon	Chuan chow	Foochow	Wenchow	Ningpo	A.D	Moon	Chuan chow	Foochow	Wenchow	Ningpo
1481						1624	A.				Dr
1483	8		St			1627	7				Fl, Dr
1486	Sp to Su	Fl				1628	S				Fl, Fa
1487	9				Dr	1628	7				St
1489	Sp	Dr				1633					Dr, Fa
1490	6			St		1635					Dr, Fa
1491				Fa.		1637	6				St, Dr
1493					S W	1638					St, Fl
1494	7	St				1639					Dr, Fa
1499	4	Fl				1640	S				St
1500	12	Dr				1640	8	St			
1502		Dr				1641					Fa
1504	9	Fl				1642					Dr, Fa
1505					Fa	1647					Dr
1509					Dr, Fa	1649	8	Fa			
1514					Dr, Fl	1650	9	St			Dr
1512					Dr	1651					
1513				Fa	Fa	1653	A.			Ty	Dr
1514		Dr, Fa.				1654	A.				Dr
1529	8	St				1656	6				St
1524					St, S W	1655					Fa
1525					Ty, Fa	1658	5				St
1527				Dr, Fa	Fa	1660	7		Ty		
1535	8				St	1662	A	Ty	FL		
1536			Dr, St			1664	A	FL			
1538					S W	1665	6	FL			
1540					S W	1666		Dr			St
1542	Sp			St		1668					Dr, Fa
1542	A			Dr		1669					
1546		Dr, Fa		Fa.	Fa, Dr	1670	7	Dr		Fl	
1548				St		1671		Dr			
1555	9			St		1672				Fa	
1558	7-8			St	Dr	1674	8			Fl	Dr
1562				St		1675	6				Fl
1569	7			St		1676	A				Dr
1570					Fl	1677	4	Fa			Fl
1575	6	St		St		1679	8				St
1576				St, Dr	S W	1680		Fa			
1579	5		Fl			1681	A	Dr			
1585	7				Fl	1682				Fl	
1586					Fa, Dr	1683	4			Dr	Fl, Dr, Fa
1587	6				S W	1684				Fl	
1589	7				St, Fa.	1686				Dr	
1592	8		Fl			1688	5	Fl			
1595	5	St				1690					Dr, Fa
1597	8	Ty	Ty			1692		S W		S W	Dr, Fa
1599					FL	1694					Fa
1601		Fl, Ty				1698					Fl
1602	6	Fl		Ty		1699	4	St			
1603	9	FL				1700	9			Fl	
1604	8	Ty				1702					Dr, Fa
1607	8	Fa				1704	8	Dr			
1608	5-6	Ty		Dr, St.		1707	S			Dr	
1609	5			Fa	Fa.	1711					
1610	5			Fl	Fl	1713				FL	
1612		St			FL	1714	S	Fl			
1614	A	Dr		Ty, Fa.		1718	6				
1615	S	3 Tides				1719	8	Fl			
1615	A.			FL		1721	5				
1616	8	FL				1722			Dr		
1617		Fa.				1723	6	Ty			Dr, Fa
1618		Fa.			Dr	1724	7				Dr, F
1620	S	S W			Dr	1725	6-7	Fl			Dr
1621	6					1729	7-8		Fl	St	FL

RECORD of STORMS, FLOODS, DROUGHTS and FAMINES—*continued*

A.D	Moon	Chuan chow	Foochow	Wênchow	Ningpo	A.D	Moon	Chuan chow	Foochow	Wenchow	Ningpo
1729	A	Dr			Dr	1809					Fa
1731	7	Fl				1810				Ty	
1734	7			St		1814				Fl, Dr	
1738	9			Fl		1818					S W
1739				Dr		1819	3			St	
1741				Dr		1819	6			St.	
1745	7				S W	1820	6			St	Dr
1747	A				Dr	1821	A.			Ty	
1749		St				1823	Sp			St	
1752					Fa	1832				Dr	
1753		St			Dr	1834					Fa
1756	8				Fl	1835	Su			Fa, Ty, Dr	
1758		FL, Dr, Fa				1836	6			Dr, S W	
1759		FL			FL	1839	7			FL	
1760	A.				Fl	1844	8			St	St, Fl
1762		FL				1847	7			Ty	
1769	6				St	1848					Dr
1772	A				FL	1849	4			St	
1796	5-6			Dr		1853	8				St.
1796	8			Fa		1854	6			St.	
1799					Dr, Fa.	1856	7			Ty	
1801	6			Ty		1858	8			Ty	
1805	5			Ty							

Of the above-named ports, only Chuanchow is situated on the sea, the others being at tide distant

Wênchow and Ningpo are fuller, because district gazetteers have been consulted, the others being from departmental gazetteers, those, moreover, are of recent date, these are a century and a half old

By "famine" nothing more in many cases is meant than local dearths, and none are stated to have been attended with cannibalism, but the poor were often driven to child-selling *

Floods are recorded only when they are remarkable for violence, extent and destructiveness, and present no peculiar appearance, as elsewhere, they overleap barriers, submerge towns, furrow the face of the earth, and destroy crops and life. The suddenness of their rush, particularly when they are the result of waterspouts or pent-up subterranean reservoirs, causes them to be referred to supernatural agency. The gyratory waterspout is considered to be a dragon, and it is likely that it gave rise to belief in such a monster, while water suddenly rushing from the ground is attributed to an embryotic dragon which is formed in an egg, the product of that aerial being and a serpent, the breaking of the egg causing the flood

By "storm wave" is meant what the records style "overflow of the sea"

The two cases of a "third tide in a day," so designated, are not to be confounded with the periodical bore or egie, but are exceptional phenomena. According to the *Hsing Pau*, that phenomenon was witnessed at Shanghai 28th October 1880. It was neap tide, low water

* Of the 35 famines recorded by WANG FENGCHOW (風洲網鑑全編, an abbreviated history), occurring between A.D. 153 and 1640, six were attended by cannibalism, in two of which parents ate their children, and children ate their parents. For an account of *Droughts and Famines in China, A.D. 620 to 1643*, by A. HOSIE, M.A., H.B.M.'s China Consular Service, vide *Journal of the N.C.B., Royal Asiatic Society*

at 015, a short time before which the supplementary tide appeared. A strong NE gale was reported as blowing off the coast on the day previous, the wave may have been due to that cause, but such gales are of common occurrence, while "third tides" are rare. The last, according to the same paper, having taken place in 1851. The earliest of those recorded in the Shanghai gazetteer took place on the 23rd day of the 6th month A.D. 1357, when "towards dawn the sea rose suddenly, causing great alarm, as it was not the time for high water, at the proper high water time it again rose, so that it was known that the first rise was not the tide. In the canal and lakes near Pinchiang and Kiahsing the waters suddenly rose some 4 or 5 feet".^{*} The subsequent occurrence of "third tides," to wit, 1634, 8th month, 1642, 8th month, 1648, 7th month, 21st day, 1661, 7th month, 26th day, 1662, 7th month, 1719, 9th month, 19th day, 1754, 8th month, 1778, 8th month, are given without remark. Occurring as they did during the typhoon season, they may have been storms which, having spent their force, were unobserved, but the cause of some of these oscillations, like the first named, must be sought for elsewhere. Although data are wanting for their co-ordination with earthquakes or submarine volcanic action, it is reasonable to infer that they are co-related, having their source in the volcanic chain which girdles the entire coast of Eastern Asia.[†]

To submarine volcanic commotion may probably be attributed a phenomenon that was observed in the summer of 1166 on the coast near Wenchow. For three days the sea made a noise and presented the appearance of coagulated milk, in the form of the perforated coin in common use, meaning apparently foaming eddies. It was preceded by a flood emitted by a serpent, which was found to be 10 feet long.

The climatologist who desires to compare the coast with an inland region on the same latitude will find the gazetteer of Chichau full of information. That department is west of and coterminous with Wenchow, and is wholly mountainous, but of no great altitude. Its "calamitous records" for the 352 years following 1511 show—Storms, 5, floods, 49, famines, 19, droughts, 44.[‡]

* "Note on Cosmical Phenomena observed in the Neighbourhood of Shanghai during the past 13 Centuries," *Journal of the N. C. B., Royal Asiatic Society*. Read 23rd December 1858, by D. J. MACGOWAN, M.D.

† Analogous to the abnormal waves that flood the China coast are those which impinge on Tungking—"Un phénomène surprenant est que quelquefois la marée, après avoir descendu pendant environ trois quarts d'heure, remonte subitement et les canaux qui les autres jours ne sont pas navigables à marée basse, le sont pendant tout le cours de la journée."

"Il y a quelques années sur une des côtes du Tunkin est survenu un événement très extraordinaire. On a entendu un bruit effrayant plus fort que celui que peut produire la plus forte canonnade, et ce bruit a été suivi d'une violente irruption de la mer, qui s'est avancée jusqu'à plus de deux lieues dans l'intérieur des terres, y a porté des arbres déracinés et des débris de bâtiments, et au bout de douze ou quinze heures s'est retirée dans son lit, ayant noyé nombre d'hommes et d'animaux et détruit plusieurs villages. Ce même phénomène avait eu lieu environ cinquante ans auparavant"—*Exposé statistique du Tunkin, de la Cochinchine, du Cambodge, du Tsampa, du Laos, du Lac Tho, sur la relation de M. de la BISSACHÈRE, Missionnaire dans le Tunkin*. Londres, MDCCCXL.

‡ The same record furnishes a singular instance of suspended animation and a restoration by a stroke of lightning. In the year 1650 a child three years of age died and was interred in the garden of his parents near the city of Suichang. "A stroke of thunder" (it is thunder, not lightning, in China, that does harm) "struck the grave, and the boy was restored to life." How long he had been entombed or how the grave was constructed is not stated. It is probable that if all the facts of the case were known, they would confirm Dr. RICHARDSON'S view that when blood does not become pectous, but remains in an aqueous condition, life may be retained to an indefinite period. It is painful to add that the child, so marvellously preserved, was soon after immolated by his father. A malicious neighbour gave out that the boy was, in fact, a "son of thunder," and that the parent was directed in not reporting the case to the magistrate, whereupon, in terror, the father killed the poor boy.

In the foregoing record the term "storms" often includes typhoons or cyclones the central portions of which passed at a distance

Disastious storms and typhoons (only of a disastrous character are included) appear to average 16 in a century

Chinese coastlanders and mariners are good prognosticators of storms "When a solar halo, variegated like the rainbow, is visible, the appearance is styled 'typhoon mother', then dogs and fowls are voiceless, and there is sure to be a sprial or whirlwind" It is a "crazy wind that blows from all quarters in summer and autumn" The Wênchow supplemental gazetteer says there is a grass the joints of which indicate the approach of a typhoon, it is called the "knowing wind grass"*

From the time of YU the Great to the present, China has been heroically struggling to defend herself against constantly recurring disasters of flood, her rivers, notably the Yellow River, "China's sorrow," have tasked the skill of her engineers, and proved a drain to her resources Has not the time arrived when she may obtain some scientific basis for ascertaining the hydrological and meteorological conditions which are the cause of her chronic ailment? What has been done for investigation of floods of the Mississippi,† which has been the model of Mr GORDON on the Irrawaddy, measurements prolonged over considerable time, and in varying conditions, systematic investigation of velocity and flood discharge at different points, and the quantity of sediment held in suspension at different depths, are extremely desirable for all those rivers or portions of rivers which are seats of foreign commerce Systematic observations with the rain gauge and thermometer over as much of the damage areas as practicable, all having reference to future hydraulic works, and for comparison with observations now making in India and Burmah to discover a connexion or co-existence with phases of flood, drought and famine between that and this portion of the continent It is still a moot question if there are cycles of famine and drought, and also on what the meteorological conditions depend, and then concurrence with the presence or absence of solar spots and their recurrence in undecennial periods It would not be difficult, moreover, for the Customs department to pursue investigation of the waters of the rivers and coasts for the elucidation of biological and physical problems connected with the Chinese fisheries

The meteorological observations which have been carried on for several years by the Imperial Maritime Customs by direction of the Inspector General have put the student of that science in possession of valuable data which in due time will be turned to practical account Only one thing is wanted in order to render future observations in China as useful as they have recently become in America and Europe The want in question is simultaneity in observation, in accordance with the request of the International Congress which met at Vienna in September 1879, to wit, "It is desirable with a view to their exchange that at least one uniform observation, of such character as to be suited for the preparation of synoptic charts, be taken and recorded daily and simultaneously at as many stations as are practicable throughout the world" This

* For a meteorological record of observations, for a period of 11 months, see *Customs Medical Reports*, May 1878, by Dr MYERS

† HUMPHREY and ABBOT, *Reports on the Mississippi* Washington, 1861-1879 *Reports on the Irrawaddy* ROBERT GORDON, Rangoon, 1879, 1880

request has been almost universally complied with, and now the globe is photographed, as it were, its atmospheric condition being taken at the same moment of actual (not local) time. It is only by simultaneous observations that the actual fluctuations and the cyclonic and anti-cyclonic movements of the aerial ocean can be accurately noted. PÈRE DECHEVRENS, Superintendent of the Sicawei Observatory, informs me that prior to January last he sent to the Chief Signal Officer of the United States army at Washington his observations made at 8.49 local time, corresponding to 7.35 A.M. Washington time, but that a modification of the time for simultaneous observation was requested, and since the 1st January meteorological observations have been taken 35 minutes earlier, or at 8.14 P.M. Sicawei mean time. To that change the International Meteorological Committee appointed by the Congress of Vienna has given its adhesion, and 08 P.M. Washington time is the instant for making observations in China, when it is decreed that the Customs shall fall into line. So extensive is the area occupied by Customs observers that their adhesion to the plan of simultaneous international observations, particularly if three daily observations are made, will be hailed with satisfaction by the scientific world, and eventually by the mercantile world as well, inasmuch as mariners are perplexed by observations made in cyclones that do not correspond with the teachings of accepted authorities on the laws of storms. They do not find that the centre of a storm always bears eight points from the direction of the wind, nor that the barometer always falls towards the centre, or always rises on receding from the storm centre. The tracks of storms laid down in charts of the China Sea require further investigation, having been made on insufficient data. A renewed collocation of the meteorological phenomena is a desideratum. Further, it remains to be demonstrated that the whole current of a storm ascends from its centre. In a word, the whole subject of the storms of this coast demands the attention alike of the navigator and the scientist. It is with no satisfaction that I give expression to doubts respecting the rules laid down by REDFIELD, REID, and PIDDINGTON, for in 1853 I published in Chinese a précis of what they had written on the subject*. The brochure was republished in Japan by the Prince of SATSUMA. I would fain recall it for elimination and modification. It may seem chimerical to propose the establishment of a meteorological observatory at each of the Customs stations, but the proposition is alike feasible and desirable, apparatus neither costly nor complicated, such as has been described by Dr. DRAPER, Superintendent of the New York Meteorological Observatory,—no photographic recording barometer being required,—a “dollar clock” forming the most intricate portion of the apparatus†. The average annual expense of American signal stations is about \$300, exclusive of soldiers’ pay and telegraphic messages, but as the observations there made are comprehensive and complicated, a much smaller sum would suffice for Customs meteorological observations‡. For example, observations made in the interests of agriculture for forecasting the weather, investigations in magnetism, atmospheric electricity, anemometry and actinometry might be dispensed with as being but remotely connected with Customs or mercantile concerns. Investigations on solar radiation and

* 航海全針 寧波 Ningpo Published at the expense of J. C. BOWRING, Esquire

† For a description of Dr. DRAPER’S instruments, *vide Scientific American*, Supplement, 3rd January 1880

‡ General HAZEN’S *Report of the Signal Corps for 1881* Washington

the absorption of the sun's heat by the atmosphere would lead to trustworthy predictions of periods of drought and scarcity, and have bearings which affect commerce hardly less than agriculture, and not very indirectly Customs revenue. In conclusion, I beg leave to suggest the adoption of the metric system by Customs observers, seeing that it must ultimately be extended to China*.

If quest be made for average specimens of the Chinese race, this beautiful, fertile, and densely-peopled region will not furnish examples, the inhabitants comparing disadvantageously with those of adjacent portions of the Empire, being physically and intellectually inferior. They are of delicate frame, insignificant physiognomy, and microcephalic—small-brained. Fewer attain to 70 years of age here than in coterminous departments, and, as in southern Chêhkiang generally, it is seldom that scholars succeed at the provincial examinations. They are simple, friendly, and law-abiding, but are charged by their countrymen as being particularly salacious. They are greatly addicted to temple attendance, and are evidently deteriorated descendants of a devout race, nowhere are temples and pagodas, monasteries and nunneries, so numerous. The religious orders are credited with contributing greatly to the perpetuation and dissemination of a contagious disorder, which accounts for their inferior physique, and as they are now largely addicted to the use of opium, there is little prospect of physical melioration.

Situated as it is on a reclaimed marsh reticulated by canals, and almost on a level with its sluggish waters, Wênchow cannot but be the abode of intermittent fever. Every spring, to some extent, and in autumn that disease prevails, affecting betimes half of the inhabitants of a village. It appears in protean form, but generally of mild type, except to new-comers, who, after acclimatisation, do not regard it with dread. Labourers and other impoverished people who cannot afford to purchase medicines lie down on the ground when seized by a fit, and after the paroxysm is over revert to their toil, and so they live until in the course of years the poison ceases to affect them, but the anæmia and debility that ensue render them an easy prey to other maladies, and they are not long-lived. Quotidian and tertian are light and transient, amenable to treatment, and disappearing on the advent of cool weather. Tertians, which are the prevailing form, assume sometimes the quartan type, becoming chronic and incurable, continuous for a year or two and then terminating fatally.

At first sight the prevalence of ague at the close of summer and in early autumn might seem due to the condition of the rice-fields. The early and the late rice are planted in May at the same time, side by side in alternate plots. The former, ripening in August, is then harvested, the latter then having attained but half its growth. A moiety of the still submerged soil being no longer shaded, is exposed to the fierce solar rays, and soon after agues begin to appear. We may not therefore conclude, however, that the poison has its genesis in rice-fields, inasmuch as those most competent to judge, the inhabitants, exonerate their fields

* Of more importance than thermometrical and barometrical observations in Formosa would be a seismological record—earthquakes in that island being about as frequent as in Japan or Luzon—its seismic area including the coast.

Valuable information on the migration of birds was recently obtained from lighthouses on the east coast of Scotland in compliance with the printed forms that were addressed to them by Messrs BROWN and CORDAUX. As on the American coast it is found on the European, that birds dash themselves against lighthouses, might not the *phares* of this coast be utilised in this manner?

from any agency in the matter. The question must be considered *sub judice*. From time immemorial Chinese physicians have been aware of the value of arsenic in the treatment of ague, but they refrain from administering it internally, their pharmaceutical knowledge not enabling them to prepare it in doses sufficiently attenuated to be unattended with danger.

Perhaps no country has suffered more from epidemic diseases than China, and certainly there is no country whose annals contain such a continuous record of calamities of that nature, consisting mainly of notices of enteric fevers, observations on which come down from proto-historic times. More than a score of centuries before HIPPOCRATES wrote of "critical days," HWANGTI, the "Yellow Emperor," is represented as referring to the same subject,—crises in disease and the natural tendency which the body has to cure itself by critical evacuations at certain periods,—in a conversation on physiology and pathology which he held with C'HIPE, his physician and minister, and since the dawn of authorship there has been a succession of medical writers, but no caste existed to hand down the earliest observations—no Asclepiades to record the cures, nor healing temples, or material for evolving an HIPPOCRATES, yet the preserved works display great acumen and powers of observation, and the careful perusal of Chinese medical works must elicit many interesting, if not valuable, facts, but that is not now feasible. In the meantime fragmentary contributions to Chinese medical history will not be unacceptable. A work that is in the hands of every practitioner, entitled *Essay on Epidemics*, discloses the curious fact that, according to the author, physicians in China had for 1,400 years proceeded in the treatment of epidemic fevers on a wrong course, which caused frightful loss of life during all that period. The work is from the pen of WU YUHSIN (吳有性 瘟疫論), a physician of Soochow, who wrote his book in 1641, but it circulated in manuscript form only until 1508, when some public-spirited scholars contributed for its publication. The edition before me appeared in 1852*.

According to Dr WU, erroneous views respecting the etiology of fever prevailed from the period of the TSIN (265 A.D.) down to his day. The profession had fallen into the mistake of regarding epidemic fever as caused by, like ordinary continuous fever, vicissitudes of the seasons, instead of ascribing them to a specific poison (厲氣). At the period of his writing, the provinces of Chêhkiang, Kiangsu, Shantung, and Chihli suffered from a fearful epidemic, but he affirms that the mortality was not due to the pestilence, but to the wrong treatment to which the unfortunate patients were subjected. "Morbific cold" (傷寒) is a generic term for fever, perhaps best expressed by *Febris synocha*. The cold of winter engenders the miasm, which enters the pores of the skin, it is non-contagious, and prevails every year,† while the poison of epidemic fevers is taken in at the mouth and nostrils, and is communicable. In the former, sudorifics are indicated, in the latter, discutients. With the exception of this great medical reformer, there has been no writer on epidemics that I can discover, after searching various catalogues. No one can write the medical history of China without reading Dr WU on "epidemics." There is one paragraph in his work which I translate for the benefit of those

* [Dates as in MS.]

† The earliest known work on fever is the 傷寒論 by 漢張機, who may have flourished any time between B.C. 200 and A.D. 200. He has had numerous successors.

foreign residents in China who may be unaware of the perils of out-door exercise on an empty stomach—a matter that does not seem to have attracted the attention of physicians until modern times. This cotemporary of the illustrious HARVEY says, of three men encountering morning malaria, one whose stomach is empty will sicken and die, the other who has imbibed spirits will suffer a disease, while the third, who has well breakfasted, escapes unscathed *.

Subjoined is a list of epidemics that have ravaged this province during the ages that have intervened since the recording of such phenomena commenced. It is from the provincial gazetteer, and from those of a majority of the departments and from several districts, so far as it goes it is accurate, but, as already remarked, those publications present innumerable lacunæ.

RECORD of EPIDEMICS in the PROVINCE of CHÊHKIANG

A.D	Moon	—	A.D	Moon	—
95	4	Hsianhsing districts	1333	3	Preceded by a flood
758		Preceded by drought and flood	1334		Western part, preceded by drought and famine
783		Preceded by drought and flood	1361	Summer	Shaohsing, two districts
791	Autumn	Western part of the province, preceded by drought	1363		Shaohsing, two districts
806	Summer	Eastern part of the province	1385		
829	Spring	Western part of the province	1403	7	Shaohsing, two districts
833	Summer	Hangchow and west	1414	7	Throughout Hangchow, Hsianhsing and Ningpo
870		The entire province	1417	5	Kinhua, epidemic, leprosy
1001		Entire province	1435	Winter	Hsianhsing, Ningpo and T'uchow
1195		Hsianhsing, preceded by famine	1443		
1131	6	Hsianhsing and western part of province, preceded by famine	1446	3	Ningpo and T'uchow, preceded by drought
1144		Hangchow	1463		Hsianhsing
1147	Autumn	Hangchow	1480-1		Hsianhsing, for 2 years
1165		Linan and Yuyow, preceded by famine	1493		Kiahsing, preceded by floods
1173	Sum, Aut	Hangchow	1510		Huchow, preceded by floods
1182	4	Hangchow and Linan	1511		Huchow, preceded by floods
1188	Spring	Hangchow	1512	Spr, Sum	Pingwu Reappeared next year
1194	6	Western part	1513		
1195	3	Linan, Hsianhsing, preceded by famine	1516	5	Wenchow
1196	5	Hangchow	1526	Summer	Yuyow and Hsianhsing, preceded by drought
1197	3	Hangchow	1546	"	Wenchow, preceded by drought
1199	Summer	Linan	1547		Kiahsing, preceded by drought
1204	5	Hangchow	1589		Epidemic leprosy over several districts, preceded by unprecedented rains
1208		Yuyow, preceded by drought	1589		Chichau, preceded by floods and famine
1210	Summer	Linan	1590		Hsiao-shan, a district of Hsianhsing, epidemic leprosy, its reappearance
1211	"	Hangchow	1591		Epidemic leprosy in Changhua district, Hangchow
1212	2	Hangchow	1622		Ningpo
1275	4	Hangchow	1624	Summer	Ningpo, preceded by drought and famine
1284	7	Hsianhsing	1628		Ningpo
1304	Spring	Hsianhsing, Ningpo and T'uchow	1634		Chichow
1305	7	Hsianhsing, preceded by famine			
1308	7	Hangchow, Yuyow and Ningpo, preceded by drought and famine			

* Dr WU quotes from the *Shanghan* (HAN period) certain interesting etymological facts, which show how some characters have been built up, the examples all relating to the healing art. Thus, for example, is the genesis of 瘟疫. Fever was originally written 瘟病, abnormal heat disease. Subsequently the 瘟 was dropped and 疔 substituted, forming the present character. In like manner 疫 was formerly written 徭役, persons pressed into temporary service as menials of Government offices (villain socage), because epidemics also penetrated everywhere, affecting every house alike, but subsequently 役 was placed under, 疔 minus the radical, being used as a phonetic 疫. Lexicographers, therefore, are slightly at fault in describing the latter character as composed of disease and a javelin, it is made up of disease and socage abbreviated.

RECORD of EPIDEMICS in the PROVINCE of CHÊHKIANG—*continued*

A.D	Moon	—	A.D	Moon	—
1641	6	Hangchow, and year succeeding	1718	6	Sringshan
1652	Autumn	Ningpo	1757		Pinghu
1660	Sum & Aut	Wenchow	1806		Wenchow, small pox.
1673	Sum & Aut	Sringshan	1811		Ningpo, small pox.
1678		Lishui	1820	Autumn	Wenchow and Ningpo, Asiatic cholera.
1680		Pinghu	1821		Wenchow and Ningpo
1681		Ningpo	1834	Autumn	Ningpo
1710		Sringshan	1835	Spr, Aut	" with dearth.
1715		Taichow, preceded by famine	1864	8, 9	Ningpo

The above is a bald but not untrustworthy record. With few exceptions, the epidemics were probably of an enteric character, but as the term by which they are designated means "diseases which affect everyone at the same time," the list comprehends numerous maladies. It relates to epidemics of a single province. Generally the epidemics named were sequels of droughts, floods, famines or civil war.

With regard to epidemics in Chêhkiang, it may be remarked they were of more frequent occurrence in the maritime regions of the province than in the hilly portions. Many of them seem to have had a limited area.

The mode of transmission of the *materies morbi* is given in only one case. In 1638 an epidemic was conveyed from Hangchow to Tungyang by female children who—a pestilence raging there—were deprived of relatives, and purchased for sale at the neighbouring city, the germ was therefore not air-borne but brought in clothes. In the toxicological chapter of the *Péntsuo*, old clothes are included as poisons.

The utility of naming the particular form of an epidemic seems to have occurred to recent compilers of gazetteers, for they mention small-pox and Asiatic cholera. The same thought happily occurred to a few of their remote predecessors, and thus an interesting fact has been transmitted—the existence of an epidemic form of leprosy. It is on record that in the year 1417, in the department of Kínhua, on the Chientang river, an epidemic of leprosy (癰風) prevailed, and also that the same malady sprang up in 1589 in the department of Shaohsing, and that the greater portion of its districts suffered, and, again, that it prevailed during the following year in Changhwa, a district in the coterminous department of Hangchow.

Concerning the contagion as it appeared early in the fourteenth century nothing is reported, that of 1558 and following year sprang up after a period of protracted and unexampled rains,—an autumn and winter rainfall extending through more than three months. During the year that this disease prevailed in the northern part of the province, there was an epidemic at Chuchau, it appears by reference to the foregoing list, and after heavy rains, but of its nature there is no record. This sudden and apparently unprecedented outbreak of an epidemic contagious form of leprosy is remarkable from the fact that the disease is seldom met with in Chêhkiang, and never, perhaps, in the northern part of the province. Fukien to the south, and yet more in Canton, further south, are the seats of that loathsome and hideous malady. Shaohsing is remarkable, however, for the prevalence of elephantiasis of the leg, perhaps there

is no part of the world which suffers to like extent from that disease—due probably, with other causes, to its low situation, being elevated but a yard or so above tide water. It appears to be the epidemic form of leprosy that SHEN LANGCHUNG describes (沈朗仲 病機彙論). The skin becomes scaly and dies, boils and ugly ulcers appear in the flesh, engendering worms, the cartilage of the nose inflames and falls off, as do also the finger-nails, the perspiration has a fishy stench, the hair and eyebrows disappear, the vision fails, and the voice becomes husky and inaudible. Therapeutic measures are futile except in mild cases. I expect to be able ere long to extend the inquiry to the Empire at large, for the purpose partly of examining the ground on which, as alleged, the “black death” of the middle ages originated in China—a besom of destruction which swept from the East over Europe to the shores of the Atlantic.

It is in local, not in general, works that full information is to be found, the search therefore involves considerable toil*. All that the abbreviated history of WANG FICHOV (鳳洲 綱鑑) records on the subject is soon told, and it is subjoined as a contribution towards the general subject. Epidemics are named in the foregoing work as having occurred in the years of our Lord 52, 1054, 1275, 1279, 1308, 1313, 1564, 1583, 1589, 1642, and 1644, when the history comes to a close.

Wênchow has had its full share of cholera ravages, the study of which at this date affords no information to the pathologist, but as a history of that epidemic in China is a desideratum, I submit the following contribution, first reminding the reader that epidemiologists in India are not in accord concerning the origin of cholera, very high authorities affirming that it is purely of Indian origin, and that it originated in the Gangetic Delta in 1813, while other not less eminent authorities find evidence of its anterior prevalence in other parts of the East, citing in support thereof Sanskrit, Greek and Arabian authors, showing that after periods of quiescence it reappears—at intervals sometimes of a century or more. But what is of more moment, these opposing etiological views, which prevail not in India only, but in Europe and America, indicate diverse measures for averting the disease and for limiting the area of its ravages, a contagious malady obviously demanding to be met by different sanitary, if not different remedial, management than a non-contagious disease. Some hold that “all the phenomena are explained by contagion communicated from person to person by a germ from the excreta of cholera patients, that water is the channel through which cholera poison is generally conveyed. Others find in local influences full explanation of the phenomena, holding that the disease is not communicable from person to person, that the poison is air-borne, travelling in obedience to certain fixed laws, and affected by atmospheric and telluric conditions, and, when finding a fit nidus, there developing the epidemic, and that there is no enteric or specific poison in water to produce it, although they insist on purity of water and sanitary regulations generally.”

The voluminous medical literature of China and the records of remarkable occurrences found in gazetteers might be expected to throw much light on these controverted subjects, particularly on the first or historical question, but the result of my investigations thus far afford

* As chapters on 疢異 that are found in *hsien* and *fu* gazetteers are more to be desired and more difficult to obtain, I beg assistance—that is, the copying out of those chapters, due acknowledgment shall be made for and in that or any other form.

only a slender contribution to the moot points,—nothing that can be considered approximately decisive,—albeit I must confess that hitherto my inquiries have been restricted to a small portion of this almost boundless field of research. The Malacca Chinese were the first to suffer from Asiatic or Indian cholera, the epidemic having reached the Straits in 1819 by way, it is believed, of Siam. In May or June of the year following it appeared in Wênchow, and about the same time at Ningpo. A septuagenarian who remembers its ravages gives a ghastly account of the city as it then appeared,—a narrative which tradition confirms, and corroborated by written and oral accounts of its first appearance at Ningpo. It then obtained the name by which it is now popularly known here, the “ciab-claw disease.” Attacks of the disease were so sudden and fatal that people were stricken down and died in the streets. The “symptoms,” to employ the expression of a French pathologist, “commenced with death.” There is but one account of this form of cholera that I can hear of, it is a monograph, the work of a physician of the city of Chiahhsing. That writer says that the disease first appeared in Kiahhsing (on the borders of Chêhkiang and Kiangsu) in 1821, and was regarded as *sur generis*, and received the designation of “contracting of the tendons of the leg” disease (脚筋吊 吊脚痧), which physicians treated as ordinary cholera, the “sudden vomiting and purging” disease (霍亂), and as a consequence they did not save one patient in a hundred. Ordinary cholera is ascribed to “accumulated heat,” which requires a cooling regimen. Our author regarded it as the result of accumulated cold, which, like excess of heat, disturbs the harmony naturally subsisting between the dual powers of the system, and accordingly prescribed warming remedies, a mode of combating the enemy which of necessity became universal. The disease again prevailed in the two years following with unabated virulence, and since that period it has been of frequent occurrence throughout the Empire, notably in Chêhkiang in 1860*. Scarcely a summer passes without the occurrence of numerous marked cases of this migratory contagion appearing in one part of the country or another,† it is now recognised as endemic. In this part of China, what has been styled “dry cholera” is common in hot weather, and is called *sha* (痧), a term that includes colic, sunstroke, heat apoplexy and various disorders that make their attack suddenly. At Canton it is more frequent than elsewhere, the Cantonese affirm that *sha* has prevailed among them from time immemorial, which may explain their belief that they have always had Asiatic cholera among them. It may be regarded now as endemic in this part of China as well, making its appearance even in winter. During the past winter various villages on the Pootung side of Shanghai district suffered from Indian cholera, the only difference which the epidemic

* According to CLEYER (*Cholera Epidemic of 1873 in the United States*), “cholera appeared in China in 1669, coming probably from Malacca,” and GENTIL, in his *Voyage aux Indes Orientales*, states that it prevailed in China soon after its appearance in Coromandel in 1769. These authorities are quoted by Dr D B SIMMONS in his elaborate article on “Cholera Epidemics in Japan” (*I M. Customs Medical Reports*, September 1879). What sources of information those writers possessed does not appear. I know not what degree of importance should be attached to their statements. Besides Dr SIMMONS, the subject has been discussed by Dr JOHN DUDGEON in the *Customs Medical Reports* for September 1872. Unfortunately, I am at present unable to consult that paper, which doubtless contains information that I might have turned to good account. Dr PATRICK MASON devotes several pages to Asiatic cholera in China in the *Customs Medical Reports* for September 1877. The September number of the *Chinese Repository* for 1843 contains a paper on cholera at Ningpo, and the August number 1851 has also a few paragraphs from myself on the same subject.

† The latest cholera visitation at this port is recorded in Mr Commissioner MACKAY’S Wênchow Trade Report for 1878. It prevailed during August and September of that year, and was extremely virulent.

presented from the summer form appearing to be that it was less rapidly fatal, the disease continuing three days before its fatal termination * The reason assigned by the Chinese for this untimely visitation was that, owing to a protracted drought, the canal waters had become polluted (While, however, the natives attribute epidemics to droughts, they also say that a protracted and excessive rainfall is often followed by an epidemic With regard to fever and ague and the weather, they affirm that disease prevails chiefly when a season is unusually windy) Undoubtedly Indian cholera was regarded in the north of China as a new disease, but it is quite possible, nevertheless, that it was only a reappearance after a period of quiescence, and some of the epidemics named in the subjoined record may have been epidemic cholera We know that the register of epidemics in recent works includes the cholera visitations A reference to a medical treatise which is more in circulation than any other† names contraction of the tendons as an occasional symptom in ordinary endemic cholera, but Dr WU states that while there is a resemblance they are nevertheless distinct diseases He might have adduced in evidence that while no one regards the "sudden vomiting and purging disease" as communicable from person to person, the new disease is regarded as contagious—a thing, however, held by many as true of fever and ague The sum of the information that I have been able to gather tends to show that Indian or epidemic cholera is new to China, and that it is not due to an enteric poison communicable from person to person, but to air-borne germs, that it is influenced by atmospheric and telluric conditions, and, consequently, that quarantine regulations to ward off invasion from the migratory foe are futile—a conclusion diametrically opposed to the opinions of Drs SIMMONS and MANSON, opinions formed by painstaking observers after recent inquiries on cholera visitations in Japan and China No measures that I can hear of have ever been taken by Chinese authorities of the nature of quarantine to ward off infection‡ Dr SIMMONS incidentally alludes, *loc cit*, to an epidemic of measles immediately preceding one of cholera, those affected by the former being attacked before recovery by the latter, which reminds me of what I wrote in 1851 on the same subject "During the autumn of 1848 (when cholera was somewhat prevalent), rubeola prevailed epidemically at Ningpo, it did not assume a malignant form, nevertheless fatal cases were not rare The epidemic prevailed in the maritime districts of the east coast of China and through the entire Pacific coast till it reached the Samoyedes, among whom it was particularly fatal A Russian captain reported 'we had throughout all our colonies the measles, and great numbers of the inhabitants were taken off Some of our islands in the Aleutian chain lost most of their population In Sitka, amongst a population of 600, we had in one month 80 deaths, if not more, nearly all, except the Europeans, were sick, so that all the town was in sorrow from fear and dread' The islands of the Pacific suffered from the same disease (all Micronesia), and at the Sandwich Islands it was very destructive amongst the aboriginal inhabitants In China it affected both natives and foreigners It is remarkable that whilst rubeola was traversing this region of the earth from the Tropic of Cancer to the Frigid Zone, cholera was pursuing a western course from the Volga to the Mississippi"§

* 申報, 19th February 1881

+ 醫宗必讀, A.D. 1637

‡ Articles on cholera are contained in the *Customs Medical Reports* from Dr DUDGEON

§ *Chinese Repository*, August 1851

Perhaps Dr SIMMONS may obtain information respecting the surging of this wave of rubeola in the islands of the Rising Sun

Besides the epidemic above named as occurring last winter and spring at Shanghai, there appeared concurrently epidemics of measles and small-pox, the former in the coterminous department of Soochow, the latter at Nanchang, in the neighbouring province of Kiangsi "Everywhere throughout the Soochow region children were attacked by measles, not of the ordinary mild form, but of a virulent type—nine cases out of every ten presenting dangerous symptoms" The reason assigned for the unusual severity of the disease was the drought of the winter, followed by a rainy, snowy spring The small-pox at Nanchang was characterised by symptoms of extreme violence at the early stage, and of their sudden subsidence, leaving the disease to pursue a quiet course to convalescence* Throngs of grateful parents presented thanks at the shrine of the small-pox god for the recovery of their children The synchronous prevalence of cholera, small-pox and measles in places almost contiguous is a noteworthy epidemiological phenomenon As a contribution to the epidemiology of China, I subjoin a list of epidemics which have devastated this province, the most disastrous only being chronicled—probably but half the number that have prevailed, as I have before me only five gazetteers out of the 11 which comprehend the province

In default of narratives from books on the subject of epidemics, an account chiselled on a mural monument in the "Temple of the Five Supernals" (五靈廟), demons of pestilence of this city, will perhaps make amends for their meagreness It appears from that record that for several tens of years preceding, Wenchow suffered every spring and summer from a contagious malady, the mere symptoms of which caused the patient to be shunned by his nearest relations, who sent them to vacant temples, supplying them there with cold victuals No one ventured out by night lest a pestilential demon might be encountered, and great distress consequently prevailed In the year 1579 a magistrate took up the matter, summoning men of age and experience to counsel him Some of these suggested the free distribution of medicines, others the interment of the unburied dead, and others a grand demonstration to propitiate the five demons which caused the malady, by which they might be exorcised and retire to the river bank. The magistrate took a more comprehensive view of the needs of the situation Favouring sumptuary and spiritual measures to combat the evil, he read the people a homily—first, on the five cardinal relations (that between Emperor and people, that between father and son, the conjugal and fraternal relations and that between friends), secondly, on the five elements (water, fire, wood, metal and earth), thirdly, on the five flavours (salt, bitter, sour, acid and sweet), fourthly, on the five viscera (the heart, liver, stomach, lungs and kidneys), and fifthly, on the five (?) passions (joy, anger, grief, fear, love, hatred, desire) The gist of this quincuncial discourse was in its application—a reformation in manners, food, and in life generally, was what he considered as requisite for sanatory improvement All those measures, at least those proposed by the elders, were adopted, and, in addition, the erection of a special temple to the five demons of epidemics was decided on (hitherto those supernals were merely honoured by shrines in various temples) With such zeal was the plan of a temple acted on that it was run up in a month, and a substantial structure it is Magistrates gave the fines of their courts, the rich gave of their

* 申報, 12th February 1881

hoards, and the people contributed free labour to the undertaking, endowing the temple with land to defray the expense of incense for ever. It is gratifying to read that the worthy magistrate was able to felicitate himself on the disappearance of the plague.

At the risk of being tedious, I add a paragraph respecting the demons of plague, belief in whom controls official as well as popular action when disease of any kind is rife. In the sixth year of KAUTSU (A.D. 591) reports of an apparition in the sky reached the Emperor, it consisted of "five mighty ones" (五力士). His Majesty consulted his minister, inquiring whether the appearance of the gods was a calamitous or felicitous omen, and received in reply the information that the "mighty ones" were Heaven-sent demons, agents of the five epidemics, to wit, those of spring, summer, autumn, winter and pestilences in general, the minister gave also the names and surnames of the demons as if they were those of characters once known among men. They were robed respectively in green, white, red, black and yellow, each held a utensil, hammer, ladle, sword, etc. "What," inquired the Emperor, "can be done to avert calamity?" "Nothing," was the response, "it is Heaven-sent, and there is no resource." That year a great epidemic scourged the entire nation. On the 27th of the 6th month the Emperor ordered the erection of a temple and sacrifices to be made to the demons, on each of whom he conferred the military title of general. During that dynasty, the SUI, and that of the TANG, temples were dedicated to ceremonies for averting the pestilential wrath of these "mighty ones," now styled "supernaturals."

In wealthy cities—Ningpo, for example,—the demons of epidemics are borne in processions of an imposing character, every guild and precinct contributing to render them magnificent, one feature of which is the appearance on a car of young girls, who seem to form portions of lotus-flowers, being sustained in the air by iron rods dexterously passing through a trouser leg, imparting a fairy-like aspect to the pageant. Occurring as this festival does in hot weather, its observance itself is often a source of sudden disease.

In this city, devotees who take part in processions that are designed to ward off pestilences subject themselves to painful proofs of their earnest zeal. They march for many weary miles with vases of burning incense suspended by hooks from the flesh of their arms, their arms being sustained in a horizontal position by a rod extending obliquely from the hip to the hand. According to the latest local gazetteer, worship at the Temple of the Demons of Pestilence does not now suffice to ward off the diseases to which the city is described as being particularly exposed, owing to atmospheric vicissitudes, albeit it is the most cleanly city in the Empire.

It is due to the school of CONFUCIUS to state that many of its disciples endeavoured to dissuade the populace from the degrading fetichism into which they are plunged, particularly in matters of hygiene. Such is the statesman who recently acted as governor of Kiangsu, he shut up monasteries, turned the monks adrift, and secularised their ill-gotten property. Such also was CHANG TZUCHI, a Minister of State under the southern SUNG, who whilom was magistrate of Changchau, in Kiangsu. In the year 1295 an epidemic ravished the city, nine houses in every ten suffering from the scourge. In vain he strove to mitigate and check the malady by establishing a dispensary and furnishing medicines gratuitously. No one applied for relief, all

who needed help for themselves or friends repaired to the Temple of the Demons of Pestilence, where sacerdotal exorcists sold charms and amulets and employed imposing incantations as the sole means proper for averting or curing the prevailing epidemic, and who deprecated the use of medicines, on hearing which the magistrate himself visited the temple, and seeing a row of images of hideous aspect on either side of a grim-visaged central monster, and witnessing the fanatical mummeries by which the multitude were deluded, he ordered the arrest and imprisonment of all concerned, then, providing fortifying viands and stimulating potations to his soldiers, to proceed forthwith to smash the images and to level the temple with the ground, a work which the military accomplished before they became well sobered and capable of understanding the sacrilegious character of their mission. Meanwhile the magistrate ordered the flagellation of the monks, and sent them back into the world. While the townspeople were all wondering what form of judgment the outraged gods would inflict on the daring iconoclast, the Emperor summoned him to a secretariat in the Civil Board at the capital (吏部郎中). Unfortunately, rulers of that stamp have neither imitators nor successors. Naturally, the medical profession is arrayed against the impostures of the priesthood, yet they recognise the need of supernatural aid for success in their vocation, and, in concert with the general public, invoke the assistance of departed practitioners of the healing art, several of whom have been canonised, and hence temples to the *Yo wang*, or Princes of Medicine, are everywhere to be found, being styled by foreigners temples of the "Æsculapius of China," although in all Chinese history there is no personage bearing the characteristics of the reputed son of Apollo. "Medicine Prince" is a title of several medical notabilities, none of whom were regular practitioners nor writers, but successful charlatans rather, one of them being a foreign adventurer. The earliest of those to whom temples of medicine were erected was PIEN CH'IAO, who flourished in the reign of WE LIH (B.C. 468-440). He was a native of the Ching state (Kaifung-fu), but his family belonged to the state of Lu, for which reason he was styled the Lu physician (扁鵲秦越人盧醫). Originally he kept a hostelry, but having met a spirit who induced him to take a certain medicine daily for a month, on the assurance that by doing so he would become spiritualised, the effect of which was that he was able to see through a stone wall, and consequently by his vision penetrate the human system and observe the viscera. Thus he became an adept in diagnosis, and the most obscure disorders gave way to his therapeutic skill. The Prince of Tsin, TING KUNG, had for prime minister a man of boundless wealth who, in the 11th year of TING KUNG, suffered from an illness that baffled the skill of the court physician, and the Doctor of Lu was sent for. He found that the patient had been unconscious for five days, but in less than three days consciousness was restored by the medicines which PIEN CH'IAO administered. The patient recovered and rewarded the doctor by a gift of 20,000 *mow* of land. The distinction thus attained he did not live to enjoy, for the court physician procured his assassination. PIEN CH'IAO is credited with anatomical knowledge obtained by dissection, and with the theory of the pulse, which, like a work attributed to him on acupuncture and the use of moxa (扁鵲神應針灸王龍經), may be taken as apocryphal. Certain it is that that work, according to the catalogue *raisonné* of the Imperial Library, was composed during the Yuan period.*

* The authorities quoted in MATERS' *Manual* err greatly as regards the period when PIEN CH'IAO lived and the place of his birth, that is, assuming the correctness of the 風洲羽鑑

In 738 there appeared in the capital a singularly attired foreigner, he wore a velvety robe and a gauze cap, he was peculiarly shod, and bore a staff, attached to his girdle were calabashes, several tens in number, containing medicines, which he freely distributed to the ailing. His fame reached the palace, and the Emperor sent for the foreigner, who announced himself as an "obtained doctrine" (*teh-tao*) man from India. His Majesty was so gratified with him that he ordered his portrait to be taken, and conferred on him the title of Medicine Prince. His name was WEIKU. A Fukien miscellany (閩雜記) names a Medicine Prince Temple or Temple of PIEN CH'IAO, also called Temple of Dr LU. Another says that the medicine prince, or *pusa*, was WEIKU, who came from Sumatra. Probably he had made himself famous in that island after quitting India before coming to China. He is described as having *teh-tao*, the Buddhist term for one who has entered Nirvana. He was not a Buddhist, however, yet a man of lofty religious character, but whether Brahmin or Mussulman does not appear. When the usurping Empress WU, in the latter part of the 7th century, swayed the black-haired race, a Taoist practitioner of medicine named WEI SHENCHUN became very celebrated by his austerities as a monk and by the cures that he effected. He was constantly attended by a black dog called "Black Dragon," and obtained by popular acclamation the title of medicine prince, or king. In pictures and images of the canonised doctor, his familiar the black dog is also represented, reminding one of the canine familiar of Western classical and mediæval times. Tradition has it that SIMON MAGUS and other ancient practitioners of the black art and charlatanry in general were attended by black dogs. CORNELIUS AGRIPPA, the famous practitioner and philosopher of the 16th century, had a familiar, what HUDIBRAS calls a "Stygian pug," the doctor's "tutor and cur which read to the occult philosopher." The idea never seems to have taken root in China. WEI SHENCHUN would probably have been soon forgotten but for the circumstance that a great Minister of State under the SUNG sway had during a severe illness a vision of WEI SHENCHUN, who was attended with a black dog, as when in the flesh. The spirit directed the boy to swallow a pill, which he did, when a flow of perspiration followed, and the patient was quickly convalescent. The child, when he came to be a ruler, caused a picture of that prince of medicine to be taken, to which he sacrificed, and thus WEI CHUN again became famous. Soochow boasts a medical pantheon. Formerly the edifice was consecrated to the three Emperors FU HI, SHEN MING, and HWANG, semi-mythic rulers. Subsequently the image of YU the Great was added, all four being honoured for their medical knowledge, and in 1692 a prefect ordered the effigies of K'I PEH, LUI KUNG, PEH KAU, KWEI YUCHU, HSIAO YU, and HSIAO, and changed the name to the one which it now bears, "Temple of the Healing Kings"* Thus it is clear that these temples cannot be considered as consecrated to a Chinese Æsculapius.

According to the teaching of alchemy, hartall—arsenic bisulphide—is prophylactic against malarious and demoniacal influences. Infinitesimal doses of which are taken with cinnabar in a little liquor on the 5th day of the 5th moon—Dragon festival, in the case of children the powder is smeared on the forehead.

Epidemic frenzies come under the consideration of the physiologist, and demand his attention as a branch of what is termed State medicine, information on which cannot but be

*The greater portion of the above is culled from numerous authors cited in the 集說詮真續編 黃伯祿斐默氏 Shanghai, 1860

useful to administrators of public affairs I submit a few paragraphs on the subject, which, if valueless to professional readers, will be found not devoid of interest to laymen In 1876 there appeared a monograph entitled *Précis of Anthelmintics* (治蟲撮要), an anonymous work by a benevolent, public-spirited gentleman of Changchau, Kiangsi It was called forth by an event which must be fresh in the memory of foreign residents,—the panic that existed respecting supernatural clipping of queues,*—and had for its object the diffusion of useful knowledge on the calamitous visitation, the treatment of sufferers and suppression of sorcery, the cause of the mental and physical distress that then prevailed over a large portion of the Empire, besides which the volume unfolds the arcana of ancient theurgic lore on this recondite matter That production and personal observation form the basis of the following account of the remarkable delusion by which the Empire for many months was strangely infatuated Little is to be gleaned from the work respecting previous epidemics of the same nature, it, however, gives dates of such periods of frenzy that have occurred in his part of the country as found recorded in local gazetteers They occurred in the following order, in the years of our Lord 1464 and the following year, 1529, 1596, 1657 and 1753 The earlier period named shows that the delusion was nearly concurrent with the beginning of witch-mania in Europe, or the date of the bull of INNOCENT VIII Happily, the delusions in China were not intensified by religious fury, and women have seldom been regarded as addicted to sorcery, although they are etymologically implicated Yao, magical, elf, bewitching, and the like, is composed of “woman” and “winning” An author of the middle of the 17th century is quoted, who gives an account of the epidemic of 1657, occasioned by wizards from the north of the Yangtze, who appeared at Chingkiang and Changchau They possessed the power of fascinating or enchanting men whom they met abroad, so that simply calling them by name they were enabled to allure them to another city and sell them by a sort of “hypnotising,” a process somewhat analogous to influences of the “evil eye,” although neither this world-wide superstition nor the myth of the fascinating power of serpents or basilisks seems to have prevailed in Eastern Asia The hypnotised being sold by their captors through Soochow and Changchau brokers led to the suppression of the practice, the brokers were severely punished, and the sorcerers quitted Changchau for Hangchau, where also they operated For about a week, however, Changchau was troubled by spiritual manifestations which agitated the entire community No one attempted to sleep by night, owing to numerous weird phenomena, rafters and tiles of houses shook with fearful noises, vapourish phantoms were observed, having a flowy smell, these at times being the size of a peck measure, and suddenly expanding to the size of a house, being, in fact, black demons assuming various shapes, as, for example, that of a fox with an enormously distended mouth, and eyes like stars, or transforming into the figure of a horse or dog These shadowy ogres entered houses and smothered people to death, or scratched and clawed them till blood flowed Attempts were made to smite them with swords, but the swordsmen merely succeeded in hacking themselves Of only one thing were these agents of sorcerers afraid,—that was noise By the continued beating of gongs, of

* The “paper men” and queue cutting craze evoked an Imperial decree (*Peking Gazette*, 15th October 1876), also a report from the Governor of Chehkiang (*Peking Gazette*, 9th November 1876), in which documents it appears that the Government regarded the excitement as being aimed at Christian missions

metal or wooden implements, and by shouting, from sunset to sunrise, the magical apparitions were kept out of houses, and in seven days they entirely disappeared. At that time, and previously, the population had suffered from effigies of men drawn on paper, which being enchanted and scattered became a source of great annoyance, particularly by clipping portions of queues, the hair being conveyed to the sorcerers, gave them power over the lives of the despoiled. Doctor CHOU had with him a temporary lodger who announced that he would sell charms to break all spells of that kind. He sold them cheaply and had many purchasers, but some malicious persons gave out that he himself was a sorcerer, a mob seized him, took him to the magistrate, by whom he was tortured for a confession till he died. Our author states that he himself doubted the truth of traditions which described the machinations of sorcerers, but the prevailing epidemic convinced him that the evils had not been exaggerated, for since the rise of the existing panic he had ocular demonstration of an apparition of a *yao*, a bewitching demon. Its eyes were like flashing mirrors, the phantom vanished, however, as soon as he had recourse to incantation, a recitation of a well-known spell-breaking rhyme. Consequently, he took up the subject and searched for plans that had been found efficacious in former visitations of the same nature, these he supplements with formulæ of his own and those of other modern investigators. The title that he adopts for his work, *An Account of Anthelmintics*, or worm remedies, is drawn from ancient and metuigico-medical writers, who describe seven different kinds of parasites or "venomous worms" that prey on the human system and which are not amenable to ordinary treatment, but require supernatural measures, united with articles of the materia medica, as antidotes. The agents employed by sorcerers are likened to those worms, and hence the combating agents are styled vermifuges. It appears that Kwangtung and Kwangsi are most noted for worm-poisoning.

Charmed bits of paper representing men are scattered by sorcerers, which are vehicles for sending out their ghostly emissaries. When by any means these spirits gain admission to a dwelling, they begin to injure the inmates, most commonly by clipping bits of a queue, the hair thus coming into the possession of the sorcerer, he can summon at will the soul or spirit of his victim, which he employs ever after as a servile demon, or "familiar," according to mediæval parlance,—the victim, of course, dying by the loss of his spirit. Sometimes the demons which are sent on the charmed paper thrust needles into the bodies of the victims, and at other times seal or stamp their skin by discoloured spots. At other times the demon personates a pedlar and palms off charmed commodities, victims being tempted to become purchasers by the extreme cheapness of the article. It was in this way that a Changchau man fell a victim to demons. He purchased a pair of scissors, and the same night cut his own throat with the charmed implement, and a man in Kiukiang came to grief by purchasing an enchanted melon. At night he heard some one calling him by name, he rose, but could see no one, at daylight he found himself bereft of all his hair.

Another mode of bringing people under demoniacal influence by sorcerers or practitioners of the black art is through the agency of animals—rats, bats, sparrows, butterflies, beetles, centipedes,—anything, in fact, that has life can be employed for their maleficent schemes.

The first symptom of invasion of the occult malady is pain in the stomach, after this the virus is diffused through the system. In children a few days suffice for that end, in

adults it often takes 100 days before effecting specific results, and sometimes even two or three years elapse before the case terminates fatally

In treating the disease recourse must be had to drugs and to counter-incantations. Loadstone pills, because of their power of attraction, constitute the chief means of cure, other medicines being employed as adjuvants, according to peculiarities in the case. Purgatives and emetics perform an important rôle, if they dislodge hairs, pigs' bristles or bamboo shavings, the patient will recover. When it is found that a person has lost a portion of his queue, an inch or two of the remainder is to be clipped off obliquely and soaked in a cloaca for a period of 80 days. Communication by aura between the hair in possession of the sorcerer and the patient is entirely severed. Most reliance, however, is placed on incantations, and anathemas that come stamped with authority, and on the occurrence of a craze epidemic, the interposition of the legally constituted custodians of public and secular interests is invoked by terrified communities. The epidemic of 1876 elicited a proclamation from the Governor of Kiangsu. If His Excellency regarded the matter as an illusion, it would not have been politic at that time to have attempted to enlighten the people, for in doing so they would have regarded him as possessed also by a malignant demon. After descanting on the pestiferous and disturbing mischief worked by the paper effigies, he proceeds to give directions for combating the evil. First, he publishes a charm composed of characters of his own invention (當融饒靈嶺靈靈靈靈靈靈靈靈靈靈靈靈靈靈靈靈), which was designed for posting over the doors of dwellings or wearing as an amulet,—it is understood that their meaning can be comprehended only by the demons against whom the cabalistic effusion is directed, and next he gives a form of anathema attributed to LAU Tz', the founder of the Taoist sect (6th century B.C., apotheosised A.D. 666 as Great Supreme), which he directs to be chanted while copying it on yellow paper with blood from the crest of a cock and vermillion, and then to be burnt, and the ashes swallowed. The words are arranged timetically and read, "Imprecation of the Great Supreme. In the name of All-powerful Heaven and All-efficient Earth, let demon ogres be decapitated and their spirits exterminated, let them not tarry for a day nor suffered to return to life. Begone, ye demons! I gulp your substance—whether ye be paper or blood, be ye transformed into dust! I [the supplicant] humbly trust that the Great Supreme will instantly command you according to his decrees." Minute directions are given concerning the mode of writing the charm, its incineration and swallowing. In conclusion, the Governor assures the people that the authorities are fully competent to cope with the evil and to combat all machinations against the souls of the people and the stability of the State.

Fortified by secular interposition, the people sought and obtained the intervention of the Supreme Pontiff of Taoism. This hereditary potentate, who is sometimes designated the "Taoist Pope," is supposed to exercise authority over demons (by demon in China the word is to be understood, not in a mediæval, but in a classical sense), appears on occasions like the present in an official capacity, he met the current emergency by the reissue of a charm or amulet which he had used against a cholera epidemic in 1862. There was scarcely a house door that was not protected by the charm, hardly an individual who did not wear the amulet under cap or in sleeve. In times of excitement, particularly when disease is rife, every house door will be found to have a charm, and foreigners may thereby know that the public mind

is in a state of ferment either from bodily or mental suffering They are subjoined, as they may be easily recognised, and their recognition sometimes proves serviceable

No 1



No 2



No 3



No 1 is from the Great Supreme, a talisman to be used at all times (the others on special occasions) It is headed by three mystic dots and an unauthorised character employed esoterically The central characters read, "Behest of the Great Extreme for driving off pestiferous influences, their vanishing from his diffused felicitous astial effulgence!" Astrology is made to play a part in the form of constellations, circumpolar and other stars The gist of the charm is supposed to be in the six demon characters on the sides, which, it is said, mean urgent and imperative commands No 2 is from the Supreme Pontiff, Exorcist and Augur-

General, and is to be worn as an amulet No 3 is from the same functionary, and is for posting on doors, the figures are known only to the initiated, our author not having fathomed their mysterious depths The promulgator of these is named CHANG, and has for his official designation, "Heavenly Teacher" He is a simple-minded, unpretentious character, and so mistrusts his power in ordinary diseases that he consults me through messengers concerning his ailments I made the acquaintance of his holiness when he was on a visit to the Faithful of the Coast, from his seat, Dragon-Tiger Mountain, Kwangsin, Kiangsi In his palace are innumerable sealed jars in which captured or exorcised demons are imprisoned Besides the duty of bottling the imps of the country, he makes appointments of tutelary guardians in every palladium temple in the Empire By his potent magic wand this master wizard wields dominion over the spirits of the universe, protecting the State from their mischievous acts, and families from their malevolence

Our author, after enumerating a large number of the innumerable arts by which sorcerers afflict their victims, states that they are to be met by means both foul and fair, the former being the employment of unmentionable filthy rags, dogs' blood, and whatever is nasty, the latter consists in the use of orthodox writings, the recitation of which is deterrent and exorcising The first chapter of the *Great Learning* or of the *Due Medium*, or the 64 diagrams of the *Book of Changes*, or the ever-cherished verses of the martyred patriot, T'EN FENGCHOU, also a well-known jingling gibberish, as an imprecation The classics are believed to possess talismanic virtue in protecting dwellings from all terrene and supermundane noxious agents, and when a house is constructed a box containing copies of the *Four Books* and the *Five Classics* By these means, combined with carrying hartall and other medicines in the belt, hanging up branches of the peach tree in the house, by noises from gongs, drums, fireworks, or otherwise, demons may be driven off

The epidemic which called forth the book under consideration continued for about eight months, from Canton to regions north of the Yangtze and as far west as the lake provinces It was surmised at the time, and fully established afterwards, that the panic was the concerted work of secret seditious societies having revolutionary aims A few myrmidons in each large city sufficed to create a stir by deftly clipping the queues of the unwary, and then announcing in places of public resort that they themselves had suffered in the same mysterious way When a few well-attested cases occurred, the cause, by common consent, was referred to paper men set loose by sorcerers, and then if one suffered from nightmare, or found a blotch on his skin, or had an attack of colic, the cause was attributed to sorcery In a word, everything that went wrong in a city, death from apoplexy or suicide, the loss of some article, or any unusual noise or dream, a phantom,—all were supposed to be the work of the invisible enemy, while some, from the mere pleasure of attracting attention and becoming objects of remark, fabricated sensational stories until a form of cerebral disease was induced in weak persons, which contributed further to fan the flame of wild superstition

Having disposed of the therapeutic portion of his essay, our author proceeds to counsel prophylactic measures The agents of sorcerers infest opium-dens, tea-shops, and are to be seen lounging at temples or hiding in forests, hills or caverns Let all suspicious persons be sought out by the gentry and elders, apprehended, and sent to the magistracy Here, however, he

interposes a needful caution, inasmuch as he hears that the criminal class band together as sorcerer-hunters, and plunder travellers on pretext of searching for proofs of connexion with those dreaded men, dexterously sticking needles of foreign manufacture on the person under search, and then exacting blackmail, which the sufferer ordinarily submits to. Soon after he meets with another sorcerer-hunting party, who, finding him penniless, take his clothes and his life as well. This is no fancy sketch, for it is well known that transactions of that kind took place subsequent to the publication of the *Anthelmintic*. Nor were the murderers ruffians only, well-meaning but panic-stricken villagers seized and executed travelling merchants under the belief that self-protection necessitated summary proceedings. It is much to the credit of the common people that, under the frenzy that seized them, they almost invariably took the suspected to the *yamêns* for judicial examination. Our author affords a glimpse of the character of judicial examination of persons suspected of complicity with sorcerers. In Hupeh an emissary was brought to trial, and it was found that under torture—trial in such cases includes torture—nothing could extort confession, not even a cry or moan, but when some charmed plasters were removed from his armpits and the soles of his feet, and when a loathsome emetic was poured down his throat, he cried out and vomited forth the truth, admitting that a sorcerer paid him \$1 for every tuft of hair that he cut, half that sum for sticking needles, and something less for stamping skins—in a word, the miserable wretch admitted all that the inquisitors sought to establish. In this way it was discovered that sorcerers direct their emissaries to reconnoitre the premises by day disguised as priests, beggars or pedlars, of places to which the paper men are to be conveyed at night, the paper men bearing the spirits of the emissaries. In view of the above, it is directed that when one awakens at night suffering from a sense of suffocation, he is to seize a dish-cloth and press it down on the spot where the missive is supposed to be, to hold it fast until someone goes out in search of the sorcery agent, who will be found sleeping in some adjacent house. On rousing the sleeper he will be found stupefied from the absence of his spirit, held under the dish-cloth he may then be easily led to the magistrate. In this manner five miscreants were seized at Wuhsi.

At Ningkuo, in Anhwei, enemies of the mission there pointed to a chapel as a place whence paper effigies of men were dispersed, and leading a mob, showed them a basketful of the effigies as proof, they themselves having placed them here. The populace became so exasperated that violence and loss of life followed. The leader hastened to the capital to get authority for further proceedings, but was cast into prison by the Governor, from which time the excitement subsided.

Widespread panics like that of 1876 are not of frequent occurrence, but crazes in a limited area are not uncommon, showing that the section of the Penal Code which provides punishment for persons found guilty of originating false rumours is necessary for the public safety. Two instances of local panics may be adduced, as they resulted from early foreign intercourse. At Ningpo, soon after the opening of the port, a single lady was in the habit of taking early walks on the city walls, a portent that needed explanation. She was not a maniac let loose, as was testified by her immediate neighbours, who stated that her only aberration consisted in going out of the way to do good. It was finally decided that she went on the ramparts to scatter paper men for bewitching and subjugating the inhabitants. To neutralise her

magic the entire population engaged the whole of several successive nights in gong and drum beating, firing off crackers, and shouting, by which the spell was broken and security ensured.

Sometimes it will be found that a wily scoundrel sets a town in a ferment to accomplish some sinister object. An instance of this sort occurred at Wenchow several years before the port was open for trade. A literary graduate who devoted himself to fomenting disputes and espousing cases of litigants—a man of great force of character, who lived by his wits, was regarded as an oracle in foreign affairs, who was more feared than respected, who was inextricably involved in financial affairs—announced confidentially to all he met that he had discovered there was a calamity impending over the city, the precise nature of which he was unable to ascertain, but this much was certain, a fleet of vessels filled with foreign women, of hideous mien, with long curly beards, would soon be found at the mouth of the river. If particulars were wanted, they might be wormed out of the only foreign resident, a missionary, to whom this scoundrel referred all whom it concerned. The consequence of this was that the missionary was shunned as if he were a leper. In truth, there was something mysterious about the foreigner, a man of herculean frame and commanding mien, sustaining himself with a pair of wands. People had not yet fully made the acquaintance of that estimable gentleman, whom they now love, but regarded the crutches which sustained him, he having lost a leg, as capable of turning the city upside down. Before the ferment had time to subside, the graduate received information that the hecaties had arrived at the mouth of the river, when he declared that for his part he had done his duty by the public, and now he would see to the safety of his family and take them up-country, and let the red-haired hecaties catch the hindmost. Before he was well off with all his belongings, the quay was rendered impassable by piles of effects of every description, which the well-to-do were conveying to boats, with wives, concubines, children, and domestics. Business was suspended, shops were closed, people stood aghast and were paralysed, they appealed to the authorities. The Taotai sent for the missionary, assuring him that he was displeased by the popular exhibition, and forthwith he issued a soothing proclamation, which quickly allayed the commotion. It was not long before the facts of the case transpired,—that the whole affair was a ruse by the graduate, who could not otherwise get out of town. Everyone smiled except his ill-starred creditors.

At the present time, according to a native correspondent of the *Shén Pau*, two medical sorcerers are exercising a powerful sway over a large portion of country bordering the Great Lake. They are dames, but assume and are accorded the title of unmarried women, implying that they are a sort of fairy. By charms they secure exemption from diseases, and by incantations they inflict disease on those who decline paying for the promised immunity. They have obtained such an ascendancy that when an illness occurs it is ascribed to their vindictiveness, and then aid is invoked. There are none so poor as not to be taxed—a dollar or so per annum,—the rich paying a hundred or more dollars. They employ several tens of men in collecting fees, and these myrmidons have become so exacting that their depredations are likened to those of robbers, and represented as more destructive than fire or flood.

These glimpses at the everyday life of the people show the need that exists for the means now in use for their enlightenment. In the diffusion of correct views regarding the seen and the unseen universe, the periodical press is a most important agency, and the demand for newspapers is an earnest that the clouds of superstition and ignorance, which

are sources of manifest weakness to the Empire, will be gradually dissipated, gradually, not quickly, for, as the West knows too well, a period of dark and dreary ages is not susceptible of rapid change

These glimpses at the social life of the Chinese disclose much suffering through ignorance and superstition, yet they do not seem to have been afflicted with delusions so disastrous as the witch-mania of our dark and dreary ages, which, it is computed, caused 9,000,000 persons to perish at the stake. Happily, the means which gradually enlightened and emancipated our progenitors are now in active operation throughout the land, diffusing correct views both of the seen and unseen worlds, the periodical press being among the most promising

The recent discovery by DA SILVA LIMA of Brazil of the existence in that country of the Indian disease beriberi, and its later discovery in Japan by Dr SIMMONS, show that that malady has a wider range than was supposed. On turning to certain translations that I made from the Chinese, and from late verbal inquiries, I find that beriberi is well known under the designation "malarial leg"—*lioh-k'v*, the same word which the Japanese pronounce *kakke* (脚氣). Not being familiar with the characteristics of the Indian malady, it did not occur to me that the Chinese malady and the Indian were identical until I read Dr SIMMONS' paper on "Kakke" in Japan.

Inquiry into the literature of malarial leg ascends to the misty and undefined period when the semi-mythic and proto-historic narratives of China interlace, it necessitates a critical study of Chinese archæology, subjects which are hardly germane to a medical report. This much, however, is relevant. A disease named *lioh-k'v* or *chiao-ch'v* is described in the *Neiching* (內經), or rather in the 靈樞經, doubtless the oldest medical treatise extant,—a work attributed to HWANGTI, B.C. 2697,—although it has no claims to antiquity much, if any, beyond the period of the early CHOU or the sources whence CONFUCIUS compiled his annals. According to a writer quoted by SHÊN LANGCHUNG in his work on *Etiology* (沈朗仲病機彙論), the "chueh" (厥) (a word meaning stone-throwing implement, which contrivance was probably named after the disease) is the "malarial leg," which during the HAN dynasties was called the "slow wind disease," and that in the SUNG sway it obtained its present designation, but the description does not apply to this disease at all,—it means a sort of syncope. It was also during that period that the earliest known monograph appeared on the subject, *Generalisation of the Treatment of Malarial Leg*,* a work long lost, but named in the Imperial Catalogue and described or copied into the great work of YUNG LOH. It is in two volumes or chapters, the last containing 46 prescriptions. Since the SUNG the disease is found described in all systematic treatises on the healing art. Two forms of the malady are recognised, which correspond with *beriberi hydrops* and *beriberi atrophica*, and, as the name of the disease indicates, their etiological views accord with those of Western observers. "Malarial leg" is caused by a poison emanating from the soil. There are two kinds, one due to moist heat, the other to moist cold. It is engendered at any season of the year by prolonged sitting or standing in a damp place, also by suddenly suppressed perspiration,

* 脚氣治法總要, published between the latter half of the 10th and latter part of the 13th century, and is probably the work referred to by Dr ANDERSON of Tokio as having been republished in Japan. Vide his pamphlet on the subject and Guy's Hospital Reports.

as when one is heated by the weather or by spirits, and disrobes when in that condition, and, according to the patriarchal Emperor, by venereal indulgence when under the influence of liquor. In the moist heat kind the pulse beats fast, in the moist cold kind it beats slowly. When the poison rises from the legs to the heart, the mind is affected, the patient mutters, there is loss of appetite and vomiting, restlessness, difficult respiration and scanty urine. In the moist warm form of the disease, the legs are painful, and there is fever, in the cold moist form, the limbs are not painful, and there is no fever. The mouth in both kinds becomes black, the skin and flesh are painful, particularly on the sides of the chest, and the tendons become prominent, these symptoms extend gradually to the face and head. Besides moisture as the exciting cause of the disease, errors in diet are named as predisposing causes. Why has this disease hitherto escaped detection in China? That is due partly to the fact that the disease is not a common one, and partly because it belongs to a class of maladies for which the intervention of foreign physicians is seldom made. Now, however, that attention is called to the subject, cases are likely soon to be reported. I have heard of one case only—the subject having but recently engaged my attention. It was that of the mother of a Chinese officer of the Imperial Maritime Customs. It was an acute attack, and terminated in one week, fatally. Native physicians pronounced the affection to be malarial leg, and from what is reported it seems clear that it was a case of the wet form of the malady.

There is reason to believe that it prevails in Tungking, and it is not unlikely that it is the disease called “mauvais vent” by Abbé RICHARD.*

Epidemics of a very destructive kind prevail among cattle, including the buffalo. The autumn of 1877 was remarkable for devastation from a murian in which vast numbers of domestic animals of every kind perished (the preceding summer was a cholera season). Horned cattle, including the cow and buffalo, horses, goats, pigs, dogs and poultry, all suffered,—the bovine race from rinderpest, goats suffered from a foot-and-mouth disease, with regard to the others my information thus far is defective. The Taotai then ruling was a gentleman of great benevolence, and rigorously enforced the law which (not, however, to the extent of the magistrate at Nanking, who about the same time beheaded a Mussulman butcher for the offence) prohibits the slaughter of cattle, and by way of compensation to farmers whose animals were superannuated, and from compassion for worn-out cattle, he established an asylum where the animals were cared for during the balance of life. There were several hundred of these in sheds situated outside the West Gate, but they all succumbed to the pest immediately after an infected cow was introduced. The area over which the epidemic prevailed remains to be ascertained, it affected the whole of this province and portions of Kiangsu and Anhwei.

Two years later, 1879, a murian of unusual violence prevailed among bullocks and camels in Mongolia, the transportation of tea between Kalgan and Urga being much impeded in consequence. A standard work on cow diseases (牛經) gives stercoraceous and mucous

* “Le mauvais vent (*Smicé*, morbific vapour?) est une autre espèce qui nous est inconnue. Le mauvais vent ou l'impression subite d'un air froid, chargé d'exhalations locales, glace tout d'un coup le sang et fait mourir sur le champ plusieurs personnes, d'autres ne sont qu'estropiées de quelques membres. le plus souvent, la bouche se déforme et tourne comme dans une attaque de paralysie. Lorsque l'impression est légère on en guérit en se réchauffant. Il y a des remèdes spécifiques contre ce mal s'ils sont administrés à temps.”—*Histoire naturelle, civile et politique du Tonquin*, par M. l'Abbé RICHARD, Chanoine de l'Eglise royale de Verelai. 2 Paris, MDCCLXXVIII.

vomiting as pathognomonic of a common epidemic, but it affords no other information that merits transcribing. Pig murrains do not often occur synchronously with cattle plagues. Dr PORTER SMITH's discovery of *trichinæ* of pork at Hankow,* and Dr MANSON's detection of them at Amoy (see last Customs *Medical Reports*), indicate that parasite to be widespread. Further inquiry will probably lead to the discovery of trichiniasis, although, for the reason assigned by Dr MANSON, the thorough cooking to which pork is subjected in China, the disease probably is of rare occurrence.

Wênchow is an opium producing region and an opium importing one as well. The domestic product is employed largely to adulterate the Indian article,—Patna, not Malwa, opium being thus employed. Native opium, being deficient in alkaloids, produces comparatively transient effect on the system, two or three hours after inhaling the smoker yearns for more whiffs of the pipe. It would be a work of supererogation at this date to comment on the demoralising effects of the use of opium or on its pathological action, but there is scope for remark on medical means of reforming smokers, and on the effects of the habit as it affects reproduction. Nine months ago the Inland Mission established a hospital for ophthalmic and opium patients under the care of A. W. DOUTHWAITE, Esq., who has in that period of time treated above 200 patients, all of whom quitted the institution as cured of the habit, having been under treatment four weeks each on an average†. There is no charge for admission into the institution, patients merely paying for sustenance. The average amount of opium daily

* *Contributions to the Materia Medica and Natural History of China*

† Since writing the above, the *First Annual Report of the Wênchow General Hospital and Opium Refuge*, by Mr DOUTHWAITE, has appeared. I append the statistics as affording useful information on the subject of this paper.—

ANTI OPIUM HOSPITAL STATISTICS

Number of patients admitted	213	Number of patients incurable	2
„ „ cured	209	Expelled for bad conduct	2

NUMBER OF YEARS SINCE SMOKING WAS COMMENCED

9 had smoked 1 year	4 had smoked 9 years	1 had smoked 19 years
10 „ 2 years	14 „ 10 „	2 „ 20 „
21 „ 3 „	11 „ 12 „	1 „ 21 „
18 „ 4 „	4 „ 14 „	2 „ 23 „
25 „ 5 „	13 „ 15 „	2 „ 24 „
29 „ 6 „	5 „ 16 „	5 „ 25 „
12 „ 7 „	4 „ 17 „	1 „ 29 „
17 „ 8 „	3 „ 18 „	

AGES OF PATIENTS

Under 20	3	Over 40 and under 50	52
Over 20 and under 30	64	„ 50 „ 60	14
„ 30 „ 40	79	„ 60 „ 70	1

AMOUNT OF OPIUM CONSUMED DAILY BY EACH MAN

7 consumed 1 mace	41 consumed 5 mace	3 consumed 9 mace
23 „ 2 „	17 „ 6 „	5 „ 10 „
45 „ 3 „	11 „ 7 „	1 „ 12 „
49 „ 4 „	10 „ 8 „	1 „ 15 „
Average, 4½ mace		

4½ mace per day is 1,642 mace, or 10 catties 4 liang=13 lb 6½ oz. avoirdupois, per annum.

If we consider those who have entered the hospital as fairly representing the opium smokers of this city, and accept the lowest native estimate of the number of smokers—i.e., half the adult males,—then reckon the population at 80,000, we shall find there are at least 10,000 opium smokers in the city.

smoked by patients treated at Peking by Dr DUDGEON was $4\frac{1}{2}$ mace, that of Mr DOUTHWAITE'S

At the above average of 10 catties 4 liang per annum, 10,000 men would require 102,500 catties of prepared opium for their yearly consumption. Crude opium loses in the process of preparation about one third in weight, accordingly, 102,500 catties of the extract represents 132,950 catties, or about 1,329 chests of the crude drug.

As only 58 chests of foreign opium paid Customs duty here last year, a great quantity must be smuggled, or brought overland from Ningpo, to supply the market.

QUALITY OF OPIUM SMOKED

69 smoked Malwa

25 smoked Patna

119 smoked native

The Indian opium contains from 8 to 15 per cent of morphine. The native drug is only about one third that strength as it is sold in the shops, but in the Suan district, about 30 miles south of Wenchow, a very superior drug is produced, which those who smoke it declare to be equal to Patna. An opium planter from that district told me that a great quantity is annually sent over the borders to Fukien, where it is sold as Indian opium. It does not become soft when exposed to the air as the Wenchow and Tsuchau drug does.

	FOREIGN	NATIVE
Largest quantity smoked daily	8 mace	15 mace
Smallest " "	1 "	2 "
Largest quantity eaten	1 "	5 "

TIME SPENT IN HOSPITAL.

Longest

40 days

Shortest

8 "

Average, 21 days

On leaving the hospital each man takes a supply of tonic medicines, so the average period of treatment is about 30 days.

The following statistics will show the work done during the past 12 months —

GENERAL HOSPITAL STATISTICS

Number of out patients treated during the year

4,030

" in patients " "

45

NATURE OF DISEASES TREATED

Eye Diseases —

Purulent ophthalmia	47
Gonorrhoeal "	9
Granular "	86
Conjunctivitis	46
Entropion with ulceration of cornea	1,626
Granular lids	205
" " with ulceration of cornea	1,030
Superficial ulcers of cornea	190
Deep ulcers of cornea	27
Pterygium	98
Iritis	9
Cyclitis	3
Cataract	2
Night blindness	15
Asthenopia	20

Eye Diseases—cont

Amblyopia	40
Abscess of orbit	2
<i>General Diseases —</i>	
Syphilis	32
Rheumatism	68
Ulcers and abscesses	146
Ague	57
Bronchitis and asthma	90
Pulmonary consumption	8
Dyspepsia	107
Anæmia	103
Hepatitis	5
Nasal polyp	3
Harelip	1

TOTAL

4,075

OPERATIONS PERFORMED

For cataract	2	For abscess of orbit	2
" pterygium	98	" harelip	1
" entropion	160	" nasal polypus	3
		TOTAL	266

patients was 3 mace 2 candareens. So extensive is the demand for anti-opium medicines that there are no city walls in the Empire that do not contain the placards of charlatans whose pills, it is vaunted, effect a perfect cure of opium-smoking desire, many of these nostrums are advertised as prepared under foreign auspices, a ruse which facilitates their sale. Opium in some form is always an ingredient of those pills which are most efficacious, and no doubt they effect much good. So long ago as 1844 I adopted a mode of treatment which may be called "thorough," in contradistinction to the above lenitive measures. It consisted in withholding from the first the accustomed narcotic and in combating the fearful consequences. A few hours' deprivation of the drug induces a colliquative diarrhoea, soon followed by seminal emissions, pain in the lumbar region, and an utter prostration. Stimulants, astringents, tonics and nourishing diet served to prop up the miserable patient until a desire was engendered for the new form of excitement, which seemed to bridge over the chasm which separated him from his former life. A taste for alcohol was never acquired by such patients, and there was no difficulty in reducing the dose until it was discontinued altogether. Patients who are cured by the lenitive method are liable to relapses. When tempted, they feel that an easy remedy is within reach, and that there is no danger of a little indulgence proving utterly ruinous, but he who has passed through the "thorough" ordeal is so impressed with its horrors that death by torture could have no greater terrors for him than a repetition of like treatment, and having been emancipated at such a cost he is hardly likely again to become enslaved. Physically and morally speaking, he has taken a new departure, and gradually recovers manhood in every sense, he, however, again becomes liable to attacks of malarial fever and catarrhs,—the narcotic, and a suggestive fact it is, affording him immunity from those disorders. I published an account of my mode of treating opium-smokers* many years ago, it was adopted by the late Dr OSGOOD of Foochow, who found the new medicine, chloral hydrate, of signal use in meeting the cravings of the patient.

The seminal discharge which speedily follows disuse of opium is noteworthy when considered in connexion with its early use as an aphrodisiac and its employment in baggios to protract orgasm, and such being the case it is not matter of surprise that its continued action conduces to impotency. To the effects, then, usually attributed to opium-smoking where it is a national habit must be added that of its being to an appreciable extent a check to the growth of population.

The Customs Report on Opium† shows—first, that, allowing 3 mace per day as the average amount of opium consumed by each man, the foreign market supplies only sufficient opium for 1,000,000 of the population, second, that the population of China is about 300,000,000, and third, that the native produce equals at least the amount exported, and therefore that opium-smokers constitute only a third of 1 per cent of the population. Allowing, as a rule—and the exceptions are extremely rare,—that only the male part of the population smoke opium, and that none under 20 years of age are its victims, we obtain a more accurate view of

* *Chinese Repository*, August 1851

† *Chinese Imperial Maritime Customs Special Series No 4, Opium*. Published by order of the Inspector General of Customs. Shanghai. Statistical Department of the Inspectorate General, MDCCCLXXXI

the number of opium-smokers, for the number of men over 20 years of age must be, on the above, about 60,000,000. Therefore we may say that 1 in 60 of the adult male population consumes foreign opium, and the same number consume the native drug, in other words, that about $3\frac{1}{2}$ per cent of the male population over 20 years of age smoke opium. My own inquiries concerning the amount of opium of native growth in China place it at over four times that of the imported article, which indicates a much larger per-centage of unwell. This, in view of the fact that population in China is constantly pressing on means of sustenance, may not be thought greatly deplorable, but when it is considered that the progeny of the opium drunkard who has not reached the last stage of decline are indubitably degenerate and inheritors of a propensity to indulge in the emasculating habit, the magnitude of the evil defies the computations of the statistician and eludes the ken of the political economist.*

As the materia medica of China has merited and received attention from foreigners, so their materia alimentaria is worth investigating. Culinary and dietary regulations abound. Particular attention, for example, is called to the importance of selecting edibles for the same meal that are not incompatible, articles which when taken separately are wholesome become noxious when in combination, so much so that such are classed among poisons. The most noted of these is a mixture of honey and onions. In some provinces they are employed for suicide, and cases are frequently reported of deaths from that cause. The great physician SUN SZEMIAO (early 7th century canonised) is quoted in the *Péntsao* as stating that raw onions and honey induce purging, and that honey and cooked onions cause death. Doubtless the two combined are so indigestible that, sustained by high medical authorities, they are popularly regarded as poisonous. In like manner honey and Chinese dates (*Zizyphus jujuba*) are interdicted. So also eel and sugar-cane. A death at Shanghai was lately reported from eating crab and persimmons.

In various parts of the Empire and for several years I have sought information on colour-blindness, interrogating painters, dyers and others likely to become acquainted with that visual defect, without finding evidence of its existence. Lately, through the courtesy of Mr DOUTHWAITE, I obtained the services of his hospital native assistant in subjecting to examination above 1,000 applicants for relief at that institution. The result of the examination, and that which I myself made among the crews of gun-boats,† failed to afford evidence of the existence of Daltonism‡. The rarity, if not absence, in China of that defect of vision, or rather of the sensorium, and the absence of evidence of its existence except among Europeans and Americans, is suggestive of inquiry if this chromatopseudopsis is not an ethnic characteristic. The examinations instituted in India among candidates for employment on railways were probably restricted to Eurasians, and the cases there discovered may not have been those of natives. Nubians, it has been lately ascertained, are free of the defect.

* The impartial chronicler of opium discussions in China will not overlook the fact that the cultivation of opium in the country is favoured by writers of note. In November last the semi-official *Hsin Pau* had a cleverly written article defending the culture and use of opium on economic grounds.

† Captain FARROW, of the Customs cruiser *Lang Feng*, and several commanders of Chinese Imperial gun boats, kindly allowed me to subject their men to examination.

‡ The irides of those examined were generally dark hazel, the others black—colours prevalent in China.

It having been demonstrated that from 5 to 7 per cent * of Americans and Europeans are at fault in distinguishing between colours, red and green for example (signal colours), it is presumable that among the hundred or more pilots of the China coast there are several who are thus disqualified from following that vocation, and it would only be in accordance with recent legislation in the West if that most useful class of our fellow-residents were subjected to the usual tests for colour-blindness. At Baltimore recently a pilot who had served 25 years without a collision had his license withdrawn because he was unable to distinguish green from red, which shows that the defect may long exist without mischievous results, and the importance which marine authorities attach to the not too common faculty of discriminating colours aught, at the same time it must be admitted that the Baltimore case seems confirmatory of the opinion of Mr POLE,† who himself has the defect of "dichromic vision," that there is no more danger of colour-blind engine-drivers or pilots mistaking red for green signals than are those of normal vision, no train or ship collision having thus far been traced to that defect.

Vaccination is making considerable progress in many provinces. Physicians in large cities who make a speciality of infantile diseases often include vaccination in their practice, but the new art is chiefly followed by persons who make it their sole occupation. Unfortunately, the extension of this great improvement cannot be viewed with unmixed satisfaction. It is to be feared that ignorance or dishonesty on the part of vaccinators may delude whole communities by spurious operations, the baneful consequences of which will become apparent when a small-pox epidemic of unusual violence appears, that disease presenting various phases of violence, from a mild to a terribly malignant form. A reaction may then be looked for which will dispel confidence in the prophylactic,—a danger which will menace society until magistrates interdict the practice of inoculation to all persons not duly qualified and licensed. I am informed by Mr DOUTHWAITE that at Kinkua vaccination has been taken up by the Buddhist priesthood, their temples having recently become the resort of mothers carrying their infants there for the operation, having implicit confidence in sacerdotal intercession with the gods for success, and as the fraternity surround the act with mystery and imposing ceremonies, they are likely to monopolise the new vocation. In like manner, secular practitioners of vaccination have been induced to resort to various devices to impress parents with the supernatural character of the rite, directing them to make pilgrimages to certain shrines, and the like, during the period of incubation. A native Christian vaccinator who would not thus deceive the people has lost all his practice, and obliged to adopt another calling.

Vaccination will not speedily supersede inoculation, which, since its introduction from Thibet (A.D. 1023-1055), has served to mitigate the violence of small-pox, which was introduced, as I formerly showed, in the 1st century from the then foreign region of Hupeh by the army of the renowned hero MA YUAN.

* Dr WILSON found among 1,154 men (about the number examined here), 17.7 per cent to be colour blind.

† "Daltonism," by WILLIAM POLE, F.R.S., *Contemporary Review*, May 1880.

Two writers in *Nature*, both having for their theme "Skin-furrows on the Hand," solicit information on the subject from China *. As the subject is considered to have a bearing on medical jurisprudence and ethnology as well, this Report is a suitable vehicle for responding to the demand

Dr FAULDS' observations on the finger-tips of the Japanese have an ethnic bearing and relate to the subject of heredity. Mr HERSCHEL considers the subject as an agent of Government, he having charge for 20 years of registration offices in India, where he employed finger marks as sign manuals, the object being to prevent personation and repudiation. DOOLITTLE, in his *Social Life of the Chinese*, describes the custom. I cannot now refer to native works where the practice of employing digital rugæ as a sign manual is alluded to. I doubt if its employment in the courts is of ancient date. Well-informed natives think that it came into vogue subsequent to the HAN period, if so, it is in Egypt that earliest evidence of the practice is to be found. Just as the Chinese courts now require criminals to sign confessions by impressing thereto the whorls of their thumb-tips—the right thumb in the case of women, the left in the case of men,—so the ancient Egyptians, it is represented, required confessions to be sealed with their thumb-nails,—most likely the tip of the digit, as in China. Great importance is attached in the courts to this digital form of signature, "finger form" (指模). Without a confession no criminal can be legally executed, and the confession to be valid must be attested by the thumb-print of the prisoner. No direct coercion is employed to secure this, a contumacious culprit may, however, be tortured until he performs the act which is a pre-requisite to his execution. Digital signatures are sometimes required in the army to prevent personation, the general in command at Wênchow enforces it on all his troops. A document thus attested can no more be forged or repudiated than a photograph,—not so easily, for while the period of half a lifetime effects great changes in the physiognomy, the rugæ of the fingers present the same appearance from the cradle to the grave, time writes no wrinkles there. In the army everywhere, when the description of a person is written down, the relative number of volutes and coniferous finger-tips is noted. It is called taking the "whelk striae," the fusiform being called "rice baskets," and the volutes "peck measures" (螺紋箕斗). A person unable to write, the form of signature which defies personation or repudiation is required in certain domestic cases, as in the sale of children or women. Often when a child is sold the parents affix their finger marks to the bill of sale, when a husband puts away his wife, giving her a bill of divorce, he marks the document with his entire palm, and when a wife is sold, the purchaser requires the seller to stamp the paper with hands and feet, the four organs duly smeared with ink. Professional fortune-tellers in China take into account almost the entire system of the person whose future they attempt to forecast, and of course they include palmistry, but the rugæ of the finger-ends do not receive much attention. Amateur fortune-tellers, however, discourse as glibly on them as phrenologists do of "bumps"—it is so easy. In children the relative number of volute and conical striae indicate their future, "if there are nine volutes," says a proverb, "to one conical, the boy will attain distinction without toil."

* HENRY FAULDS, Tsukiy Hospital, Tokio, Japan. W J HERSCHEL, Oxford, England.—*Nature*, 28th October and 25th November 1880

Regarded from an ethnological point of view, I can discover merely that the rugæ of Chinamen's fingers differ from Europeans', but there is so little uniformity observable that they form no basis for distinction, and while the sturæ may be noteworthy points in certain medico-legal questions, heredity is not one of them

It is matter of regret that quinine, the anti-malarial value of which the Chinese fully appreciate, should, owing to its cost, be unobtainable by the masses, it is a national evil and merits attention on the part of the Imperial authorities, who might, there is good reason to believe, do much towards its mitigation. From the result of experiments made by the Dutch in Java and by the English in India in acclimatising cinchona trees, there is sufficient encouragement to attempt their introduction into Yunnan and other southern portions of the Empire. An additional inducement is afforded by the fact that in India cinchona plantations have already become a source of revenue, the trees being found so rich in alkaloids that some plantations have yielded \$8,000 per acre. But for the successful acclimatisation of cinchona trees in those countries, the world would soon suffer from a quinine famine, as the cinchona forests of South America are in the course of rapid destruction. At the same time it is extremely desirable that the Imperial Government or the Governor-General of the southern provinces should be moved to introduce eucalyptus trees extensively, the prophylactic of malarial fever, which is so injurious to the best interests of the State. Private enterprise has accomplished something in acclimatising and cultivating eucalyptus, but the aid of Government must be invoked and obtained before that invaluable tree casts its protecting shade over the countless hamlets of fever-haunted regions where lurks the subtle foe of their inmates. The most successful of the attempts that have been made in that direction were with seeds kindly provided by Dr ABBOTT of the Hobart Town Botanic Garden, to whom I applied for those of trees that flourished in the highest southern latitude and at the highest elevation, as most likely to endure the cold of a Shanghai or Ningpo winter. Although the various species that I experimented with failed in those parts, the plants rarely thriving beyond the third year, yet further south the result has been all that can be desired. It is true that recent observations are unconfirmatory of the anti-miasmatic properties of this exotic in Algeria and California, but if its prophylactic virtues have been exaggerated, there can be no doubt that its extensive culture would be advantageous because of the peculiar value of its wood*. A minister like Tso TSUNG-TANG, whose recent work of tree-planting in Kansuh is unequalled by any like feat in history, requires no solicitation to favour such an undertaking as the acclimatisation of useful plants.

Now that the Imperial Government favours the study by its youth of foreign science, it is not premature to lodge a plea in behalf of a scientific pursuit which is practically interdicted, that is, dissection of the human frame. In presenting the subject, it can be shown that neither army nor navy can be effective without a corps of duly qualified surgeons, and that anatomical knowledge is the first thing to be imparted to that branch of the military art, and that such knowledge is to be acquired by dissections alone. By presenting the subject

* I prepared an account of the eucalyptus, which was published in Mr FRYER's Chinese magazine, 格致彙編, in 1879, which induced ex-Minister KUO to apply to me for seeds, which have thus far proved a success in southern Hunan.

discreetly, the prejudices which prevail may soon be overcome. With conservatives like the Chinese, precedent goes very far, and it might not be amiss to remind them how the Emperor HSIAO WU delivered up certain prisoners for a sort of vivisection, from which an inference may be drawn in favour of the delivery for dissection of the bodies of executed criminals. In the year 459 there appeared at the court of that monarch an embassy from the Yuehpan (悅般國), a tribe of Huns, whose southern boundary was the volcanic portion of the Tien Shan range. In the train was a magician who professed to be able to sever a man's throat and vessels, and come so near decapitating him that his head would fall back, and though basinfuls of blood flowed, the administration of a drug would arrest the hæmorrhage and cause the wound to heal without a scar¹. Moved by curiosity, if not by a desire to promote physiological knowledge, His Majesty ordered the experiment to be tried on prisoners. The operation was perfectly successful, and restoration completed in a month. HSIAO WU liberally rewarded the magician, and directed the study of the art. It was remarked that the herb by which the cure was effected was to be found on certain famous hills in China².

Coming down to a later period, we are told of a Governor ordering the evisceration of 40 criminals and *enceinte* women and children for anatomical purposes, causing examination of the viscera to be made by skilful physicians[†]. It may be fairly argued that if an Emperor of good repute committed prisoners to what he must have regarded as vivisection, and if a Governor ordered with impunity such cruelties on the living, surely a magistrate may consign the cadavers of the decapitated to anatomists for dissection, a course which, if discreetly done, will occasion no popular ferment, considering how eager the people of this city were the other day to witness the cutting out, by the public executioner, of the heart of a living malefactor. The thousands who witnessed the flagitious act were envied by the rest of the population who were debarred the spectacle. An additional inducement for the utilisation of persons capitally executed is afforded by the fact that it would probably serve as a deterrent to crime, owing to the dread of postmortem mutilation which is generally entertained by all classes of the Chinese. Evidence in support of the utility of postmortem examinations is furnished by the highest medical authority that the Chinese acknowledge, the *Péntsao*, which narrates the case of a man of rank, who, as well as his slave, suffered from abdominal pains. The slave succumbed to the malady, and the master, opening the body, discovered a red-eyed white turtle, on which he tried the effect of various medicines, none of which killed the animal, by accident, however, it was discovered to be soluble in horse urine, from which he inferred that that article, hitherto unknown as a medicine, would dissolve the tumour that occasioned him so much pain, he tried it and was cured. Since that time equine urine has held a high place in the pharmacopœia for treatment of visceral tumefactions and various other disorders. Its virtues as a medicine might never have become known but for the autopsy in question.

* 太平寧字記 (A.D. 976-983), book 186. In the Imperial Catalogue this celebrated work on topography is stated to consist of 193 books, which is one less than the actual number. Among my notes from this work, I find the following in relation to the Yuehpan: "Before each of their three daily meals they perform ablutions and gargle." Such an un-Mongolian custom is noteworthy.

† *Mémoires concernant l'Histoire, etc*, tome viii, p. 261.

By adducing facts like these we may gradually reconcile the Chinese to the proposed innovation

Supplementary Meteorological Note, January 1882—The year just closed was remarkable for the extraordinary number of typhoons which devastated the China Sea, not less than 20 having been recorded, the last of the series occurring as late as the month of December. Allowing that certain cyclones were counted twice, it must be conceded nevertheless that the season in this respect was unprecedented. It may be remarked also that the fogs which regularly prevail in the latter part of April were denser, more protracted and wider spread than usual. The expression of COLUMBUS with regard to fogs which he encountered off Cape Verd, "that they might be cut with a knife," was peculiarly applicable to those of last spring on this coast and the Yangtze. Besides, the barometrical reading during December was remarkably high, in many places unprecedentedly so. At Wênchow, which is on the isobaric line, 30.02, the aneroid indicated a pressure of 31.20. It differs from the standard barometer of the Shanghai Customs. Coincident with the exceptional season has been, according to the *Sheng Pau*, an unusual number of epidemics in Kiangsu and northern Chèhkiang—autumnal diseases being rife, children chiefly suffering, while about the beginning of December puerperal fever raged in Soochow. Many cases were incurable, and within 10 days several tens of recently delivered women succumbed to the prevailing epidemic.

Dr ALEXANDER JAMIESON'S Report on the Health of Shanghai for the
Half-year ended 30th September 1881

ABSTRACT of METEOROLOGICAL OBSERVATIONS taken at the Observatory of the Jesuit Mission
at Sicawei, for the Six Months ended 30th September 1881 Latitude, $31^{\circ} 14' 32''$ N
Longitude E of Greenwich, $121^{\circ} 29' 8''$

DATE	Baro meter at 32° F	THERMOMETER.		Elastic Force of Vapour esti mated in Inches of Mer cury	Hu midity, 0-100	Ozone, 0-21	Velocity of Wind per Hour	Mean Direction of Wind	Total Evapor ation during Month	Total Rainfall during Month	REMARKS
		Diurnal Mean Temperature in Shade	Extreme Temperature in Shade								
1881	Inch	° F	° F	Inch			Miles		Inch	Inch	
Aprl.	Max	30 318	79 2	0 725	99	21	29 26	S 71° E	2 461	4 726	Fifteen days rain
	Mean	29 958		0 389	80	13	10 54				
	Min	29 515	43 9	0 170	35	7	0 00				
	Range	0 803	35 3	0 555	64	14					
May	Max	30 319	82 6	0 744	94	17	21 82	S 67° E	2 262	3 690	Fifteen days rain Storms on the 1st, 3rd and 19th
	Mean	29 936		0 475	79	13	7 56				
	Min	29 651	49 5	0 236	35	7	0 62				
	Range	0 668	33 1	0 508	59	10					
June	Max	29 907	93 6	1 048	100	19	22 94	S 39° E	2 167	6 704	Fifteen days rain Storms on the 5th, 25th and 27th
	Mean	29 760		0 741	85	11	5 89				
	Min	29 552	62 2	0 461	54	3	0 00				
	Range	0 355	31 4	0 587	46	16					
July	Max	29 947	97 0	1 197	100	17	44 58	S 26° E	2 804	5 515	Nine days rain. One storm on the 25th One typhoon on the 16th
	Mean	29 692		0 935	87	8	8 68				
	Min	29 104	67 1	0 622	57	1	0 00				
	Range	0 843	29 9	0 575	43	16					
August	Max	29 888	96 8	1 212	100	16	31 19	S 48° E	4 213	10 118	Ten days rain Storm on the 2nd Typhoon on the 27th and 28th
	Mean	29 727		0 947	86	7	10 66				
	Min	29 400	64 2	0 582	61		0 00				
	Range	0 488	32 6	0 630	39	16					
Sept	Max	30 118	88 3	1 020	100	17	20 65	S 68° E	2 196	6 116	Thirteen days rain
	Mean	29 910		0 711	83	9	7 25				
	Min	29 682	60 3	0 307	30		0 63				
	Range	0 436	28 0	0 713	70	17					

For the above abstract of observations I am, as on former occasions, indebted to the Rev Father DECHEVRENS, S.J., whose kindness in thus periodically summarising a portion of his records, is unfailing

Speaking generally, the note of last summer lay in its violent and constantly recurring atmospheric disturbances Every month was stormy, and from May to September typhoons

prevailed on the China coast, Shanghai experiencing the effects of most, if not of all, of them April was unusually rainy, and the weather did not clear up permanently during the entire season The range of temperature was meanwhile very wide, nights of comparative coldness succeeding days of considerable heat, during which the air had been saturated with moisture At Sicawei 37 inches of rain fell during the 77 wet days of the half-year The highest temperature was registered on the 25th July (97°) So far as mere heat was concerned, the season was not trying, and it will be observed on reference to the burial return given below that but one death occurred from heat apoplexy

BURIAL RETURN of FOREIGNERS for the Half-year ended 30th September 1881 *

CAUSE OF DEATH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	TOTAL
Small pox	1†						1
Typhoid fever					1	1†	2
Remittent fever						f 1§	1
Pernicious intermittent						1	1
Cholera						1 f 1 5†	7
Dysentery						1 f 1	2
Diphtheria	1 f 1						2
Phthisis universalis						1‡	1
Phthisis	1‡	2			f 1	f 1	5
Marasmus				1			1
Cancer of breast					f 1§		1
Alcoholism					1		1
Heat apoplexy					1		1
Convulsions				f 1		f 1	2
Cerebro spinal sclerosis					1†		1
Paralysis					f 1		1
Rupture of heart				1			1
Disease of heart	1	1‡ f 1					3
„ aorta					1		1
Congestion of lungs				f 1			1
Chronic diarrhoea			f 1§				1
Diffuse ulceration of intestines						f 1	1
Cirrhosis of liver			1		1		2
Abscess of liver						1†	1
Uræmia				f 1			1
Cirrhosis of kidney						1	1
Bright's disease						1	1
Necrosis of jaw						1	1
Accident	1†¶						1
Opium poisoning	f 1§						1
Drowned				1†			1
Suicide				1†			1
Uncertified	1		1 f 1		f 1	1‡ f 1‡	6
TOTAL	8	4	4	7	10	22	55

* Not including deaths, if any, among the Catholic religious bodies

† Not resident (12)

‡ Native of Manila (5)

§ Native of Macao (4)

|| Young children (10)

¶ Fracture of skull

Omitting 1 suicide and 3 deaths from accidental causes, 51 deaths remain to be attributed to disease Of these, 10 occurred among young children, and of the 41 remaining, 9 occurred among non-residents The mortality among foreign residents past the age of early childhood was thus 32 (20 males and 12 females), as against 16 males and 3 females during the same period of 1880

Subdividing the above figures, as I have done in previous Reports, we arrive at the following results —

CAUSES OF DEATH FROM DISEASE among RESIDENT EUROPEAN ADULTS, April to September 1881

Typhoid fever	1	Paralysis	1 (female)
Cholera	2 (1 female)	Diseases of heart and aorta	4 (1 female)
Dysentery	2 (1 „)	Diseases of abdominal viscera	6 (2 females)
Phthisis	4 (2 females)	Necrosis	1
Alcoholism	1	Uncertified	3 (2 females)
Heat apoplexy	1		

16 males and 10 females

CAUSES OF DEATH FROM DISEASE among NON-RESIDENT EUROPEAN ADULTS, April to September 1881

Small-pox	1	Cerebro spinal sclerosis	1
Typhoid fever	1	Abscess of liver	1
Cholera	5		

9 males

CAUSES OF DEATH FROM DISEASE among the CHILDREN of RESIDENT and NON-RESIDENT EUROPEANS,
April to September 1881

Pernicious intermittent fever	1	Infantile marasmus	1
Diphtheria	2 (1 female)	Convulsions	2 (females)
Congestion of lungs	1 (female)	Uncertified	1

4 males and 4 females

CAUSES OF DEATH FROM DISEASE among NON-EUROPEAN ADULT FOREIGNERS, April to September 1881

Remittent fever	1 female (native of Macao)	Disease of heart	1 (native of Manila)
Cancer of breast	1 „ („ „)	Uncertified	1 („ „)
Phthisis	2 (natives of Manila)		

4 males and 2 females, all of whom were resident

CAUSES OF DEATH FROM DISEASE among the CHILDREN of NON-EUROPEAN FOREIGNERS,
April to September 1881

Chronic diarrhoea	1 female (parents natives of Macao)
Uncertified	1 „ („ „ Manila)

2 females

The death returns call for but little remark, in spite of the unusually high mortality of the season. For it will be observed that phthisis accounts for six deaths, while various affections of the nervous, respiratory, circulatory, digestive and urinary systems which are but remotely, if at all, influenced by climatic conditions, contributed at least 16 more. The startling character of the figures is thus in great measure attributable to chance. The influence of chance is also evident in the disproportionate number of deaths among females (12 adults and 6 children), none of which were due to diseases exclusively affecting women. Seven deaths in the month of September were certified as caused by cholera, and these were followed by six others in October. How far climate, with its associated conditions, is answerable

for the production of that extremely acute and fatal form of gastro-enteritis which is known as cholera, and which now invariably presents itself here during late summer and early autumn, cannot be determined until means are provided whereby the facilities for observation offered by the General Hospital may be put to some practical use. Almost all the persons attacked belong to that unprotected and uncared-for class whose members in order to be properly treated during illness must be placed in hospital. Private practice, therefore, yields hardly any opportunity for the accurate investigation of whatever may be the underlying condition, while in the actual state of pathology more or less slovenly postmortems have lost any value that they may perhaps have once possessed as aids to the investigation of disease. They serve only as delusive signs of an activity which, even conscientiously applied, would, if confined to this direction, produce little fruit, or none. Meanwhile it seems clear that, whatever be the ultimate cause of the disease, its incidence upon individuals is largely due to neglect of ordinary and obvious hygienic precautions. The occurrence of diphtheria, hitherto a very rare event in Shanghai, is noteworthy. To enteric fever but two deaths are attributed in the period under review, but later in the year four fatal cases were recorded. So with dysentery. The two cases which alone proved fatal in the April-September half-year were supplemented by three in October.

DISTOMA RINGERI AND PARASITICAL HÆMOPTYSIS

By PATRICK MANSON, M D

IN the Customs *Medical Reports*, vol xx, page 10, I called attention to a new parasite, the mature form of which had recently been discovered by Dr RINGER in Tamsui, Formosa. I therein succeeded in associating this animal with a peculiar form of recurring hæmoptysis, common in one part at least of the Chinese Empire, which had hitherto not been understood, and I gave some particulars of a case occurring in my own practice, in which the association was apparent. At that time I was unaware that Professor BÆLZ of Tokio had been working at the same subject, and it was not until I read, in the *Lancet* of 2nd October 1880, a summary of a paper by this gentleman, that I learned that this disease had been described by him, and that it was not uncommon in Japan. Although Professor BÆLZ, in the paper I refer to, errs in calling the bodies which I have proved to be the ova of *Distoma Ringeri*, gregarinæ, yet, though I do not know the dates of his investigations, the merit of priority in the discovery probably rests with him.

In my Report I mention that in making a postmortem examination of a Portuguese dead of aneurism of the aorta, Dr RINGER found a parasite in the lungs, that in the sputum of a Chinaman suffering from a chronic intermitting hæmoptysis, I found certain bodies I had no difficulty in recognising as the ova of a parasite, and that when these bodies and the ova emitted by *Distoma Ringeri* were compared, they were found to be identical in size, shape, colour and contents.

Of the parasite discovered by Professor BÆLZ, the *Lancet* says that it is

Met with in two forms (1) as yellowish-brown ovoid bodies of 13 mm long and 07 mm wide. They have a double contour, from a translucent wall, 02 mm thick, which in different positions appears greenish or reddish, and at the larger end is a kind of cover, at which the cyst opens. The contents consist of delicate jelly-like material, in which are imbedded three or five aggregations of smaller bodies. The latter consist (a) of spherules about twice the size of a white blood corpuscle, colourless, with sharp outlines. Around these spherules, and more or less enclosing them, is (b) a coarsely granular material scattered through the jelly, and in it molecular movements may often be seen. When the spherules have left the cyst, they show for a time the same movements, and then become invested with the granular substance, and become motionless.

These bodies, he concluded, are a stage in the development of gregarinæ, and he therefore proposes to call the disease they are connected with gregarinosis pulmonum, and the parasite gregarina pulmonum or gregarina fusca.

As the above description applied pretty accurately to the ova of *Distoma Ringeri*, and as they were associated with hæmoptysis, I concluded they were identical, and wrote to Professor BÆLZ, requesting him to send me a specimen of the characteristic sputum from Japan. He very kindly did so, and I had no difficulty in seeing that the bodies he described were identical with those I was familiar with and with the ova of *Distoma Ringeri*. Indeed, in his

letter to me the professor says that both he and LEUCKHART had already suspected they might be the ova of a distom. That this view is the correct one will receive additional and corroborative evidence in the sequel

During the last 18 months I have made many unsuccessful attempts to find the ova of the parasite in the sputa of natives of this district. I suppose I have examined altogether about 150 individuals. Therefore it is not at all likely that the disease is common in Amoy and its neighbourhood. It is quite otherwise, however, in North Formosa, though only separated from us by some 200 miles of sea. Being anxious to attempt the development of the embryo, and despairing of finding supplies of ova in Amoy, I applied to my friend Mr JOHN GRAHAM of Tamsui to find me some sputa. He answered my letter by sending me two bottles full of ova-laden sputum, one of which was filled by his house-boy, the other by his coolie. Dr JOHANSEN also recently sent me six specimens of sputum, three of which contained ova in abundance, of the ova-laden sputa one came from his hospital assistant, the other two from peasants living near Capsulan, a place about 40 miles to the south-west of Tamsui. The facility with which these cases were found proves that the parasite must be very common about Tamsui, and Mr GRAHAM'S servants, who some time ago both visited Amoy, told me that hæmoptysis, such as they themselves suffered from, was extremely common. Regarding their acquaintances, one of them said that 20 or 30 per cent, the other that 15 per cent, spat blood. Possibly these are overstatements, but at all events they show that the disease is extremely prevalent. With regard to Central and South Formosa, I recollect very distinctly my surprise at the large number of cases of hæmoptysis I used to meet with there, and have now little doubt that in *Distoma Ringeri* we have the explanation.

The geographical distribution of this parasite is peculiar, if it is the case, as seems probable, that it is rare or entirely absent on the mainland of China. We have Professor BAEZL'S authority for its existence throughout Japan. I suspect, therefore, that there is something in the soil or geological structure common to Japan and Formosa, but not present on the neighbouring continent, that determines this apparent caprice in the distoma area, and that this geological element, whatever it may be, is one necessary to the existence of the intermediary host. The distribution of similar parasites depends principally on the distribution of their intermediary hosts, this fact can easily be understood. Both Japan and Formosa resemble each other in being volcanic, and are both members of that long string of volcanic islands that, stretching along the eastern coast of Asia, includes, besides these, the Loochoos, the Bashees, the Philippines, and a host of smaller islands. I believe that extended inquiry will show that *Distoma Ringeri* exists in all of these.

Parasitical hæmoptysis can readily be diagnosed. There is a history of irregular intermitting hæmoptysis associated with a slight cough, and, in the intervals of more active bleeding, the expectoration once or several times a day of small pellets of viscid, brownish mucus. Violent exercise is apt to produce profuse hæmorrhage, and irritation of the lung in any way so as to induce coughing causes the discharge either of quantities of blood or of the characteristic sputum. At the same time there are no objective symptoms of lung disease, and the patient probably enjoys good general health. Examination of a small portion of the sputum with the microscope at once settles the diagnosis. I many times examined sputa from the

two cases I had under close observation for a considerable time, and never failed to find abundance of ova, sometimes counting as many as 20 in a single field

The following are short notes of the two cases I refer to I am told they are typical examples of the disease as found in Formosa

HENG, male, æt 31, resides in Sinhang, Tamsui, where he works as a house coolie His family, he says, is quite healthy, his mother, aged 44, and three brothers and four sisters are alive and well His father died at 58 of dropsy, and a sister died in childhood of small-pox. He himself is liable to ague He was born in the town of Banka, and lived there till his 18th year, then he lived in Kelung for two or three years, afterwards he removed to Hobe, Tamsui, where his home has been for the last 10 years He has travelled about the north part of the island a good deal, been in Tekchham two or three years ago, and eight years ago accompanied some Japanese to Khilai, on the east coast, where he resided for upwards of a month His blood-spitting dates from 11 years ago, he was then working on the tea hills with his father, near Banka At first he noticed when he breathed hard in carrying heavy burdens that he coughed a little and brought up mucus mixed with blood, from that time till now has spat blood more or less constantly, some days none, other days a considerable quantity Once when pulling in a boat about two years ago he suddenly brought up over a bowlful of pure blood, but as a rule, unless exerting himself violently, he only brings up a few drops mixed with the mucus Sometimes he does not spit for a few days, perhaps a month on end, and then the hæmoptysis recurs, to last for one or two months He has a slight cough, but on auscultation nothing much amiss can be detected His thorax is very finely developed He says that he never exercised discretion about the water he drank, especially when young, used to take it from river, well, paddy-field or ditch, whichever lay most convenient, and he says that nearly all North Formosans are similarly indiscreet

HENG lived in my house from the 14th to the 31st July, and during the whole of this time he could nearly always cough up blood or ova-laden mucus such as I have described

HÊÔ, male, æt 22, born and resident in Hobe, Tamsui, a house-boy Father and mother are both dead, both of them of some dropsical affection Until he was 18 years of age, enjoyed excellent health, then, without any obvious cause, he began to spit blood, especially after making any very great exertion During one year, many times each month, he continued to spit blood, about an ounce at a time He then got lighter work and the bleeding ceased, and has not recurred, but he has a cough still, and almost every day expectorates pellets of tenacious, muddy, yellowish-brown mucus Sometimes for several days, if the weather is fine and his work is light, there is no cough or spit, but when the weather changes, or he has to exert himself, the cough and spit return He complains of some pain about the left nipple, but the lungs appear healthy His sputum is as described, and abundance of ova can be found in it

When examined with the microscope, the ova of *Distoma Ringeri* are seen to be shaped very much after the fashion of a fowl's egg, with the exception that a circular operculum about half the breadth of the egg closes the broad end On an average they measure about $\frac{1}{300}$ " \times $\frac{1}{100}$ ", but some specimens are slightly larger and others slightly smaller There is considerable diversity likewise in shape, some being more globular than the majority, whilst others are more elongated and tapered towards the narrow end Their colour, which, when blood is entirely absent, as is sometimes the case, imparts the characteristic brownish tinge to the sputum, is a dirty reddish brown, and appears to reside both in the shell and in the granular portion of its contents The shell is without markings, and shows in double outline, more especially when it has been fractured by pressure When viewed with a high power the ovum is seen to contain one, two or more well-defined, pale sarcode globules embedded in a structureless matrix containing abundance of irregularly disposed dark granular matter

Usually one of these sarcode globules is brighter and better defined than the rest. By careful focussing they are seen to be made up of very minute granules in a state of active molecular movement. Pressure ruptures the shell at the opercular end, forcing out the contents, which resolve themselves into innumerable globules of all sizes, from fine microscopic granules to large bodies $\frac{1}{3000}$ " in diameter. The smaller particles exhibit very active molecular movements, and tend after a time to coalesce round the larger. No trace of a differentiated embryo can be distinguished. Once or twice I have seen attempts at yolk cleavage, a dozen or more elongated cell-like bodies with a bright nucleus in each occupying the whole of the interior of the egg, but never anything more advanced than this.

It is evident, therefore, that some time must elapse before an embryo can be sufficiently developed to start on the independent existence which has been found to be the first step in development in those distoms whose early life history has been studied. Reflecting that the ova are deposited in the sputum, that this affords probably their only means of escape from the human lungs, and that they are placed in it with a purpose, I concluded that by following out the destinies of a sputum I should probably be set on the right track for working out the first stage at least of the history of *Distoma Ringeri*.

When sputum is cast on the ground one of three things may happen: first, it may be eaten by earth-worms, molluscs or other creatures; second, it may dry up and mix with the soil, the solid parts of it being perhaps afterwards blown about as dust; third, it may be washed and carried away by rain into well, ditch, pond or river. I considered that if in any of these ways the ova are borne to suitable incubating media, the last is the most likely to favour the development of the distoma, and most in consonance with what happens in the case of better known species. Accordingly, I determined to imitate nature as far as I could in this direction, on the supposition that rain or water was the first agency that operated on the ova. I procured two supplies of sputum from the man HENG: one lot I placed, without admixture of any sort, in a wineglass and covered it up, keeping it for comparison and future experiment; the other lot, measuring about 1 oz and containing many thousands of ova, I shook up with about an equal quantity of filtered well water until the mucous blood and ova were thoroughly diffused. This was divided into about equal portions between six wineglasses, and water sufficient to fill the glass was added to each. These were numbered 1, 2, 3, 4, 5, 6, and placed under a glass shade in a room where, during the subsequent steps of the experiment, the thermometer ranged between 80° and 94° F. Next day No. 1 was not disturbed, but all water, except the drachm or two at the bottom of each glass, containing the sediment and ova, was removed by means of a syringe from 2, 3, 4, 5 and 6, and fresh water added. On the following day 1 and 2 were not disturbed, but 3, 4, 5 and 6 were again watered, and so on. Thus in No. 1 the ova were washed once, in No. 2 twice, in No. 3 thrice, in No. 4 four times, in No. 5 five times, in No. 6, six times, the washing taking place at intervals of 24 hours. My notes of observations show that no development occurred in the unwashed ova, that it was delayed in No. 1, where only one washing had been performed, that it advanced steadily without much notable difference in 2, 3, 4, 5, 6, until at the end of from six weeks to two months the majority of the ova produced active ciliated embryos. A small quantity of sediment from one or more of the glasses was removed with a pipette daily, or every second day, and examined under the

microscope Ova were always easily found For the most part they were entangled in little flakes of miscellaneous *debris*, but from this they could easily be separated Notes were made of the various changes as far as they could be detected, but for the first few weeks, on account of the dark granular character of the contents, it is difficult to say precisely what the different steps were that led up to the formation of the mature embryo Great molecular activity can be detected in the paler globules for some time, then these lose their distinctness, large oil globules appear about the periphery of the yolk, and a paler mass shows in the centre (Figs 1 to 11) In time the latter contracts, leaving the shell by a considerable space Languid movements ensue in it, these become more active, a ciliated epithelium is developed on its surface, and an indentation at the opercular end indicates the presence of a mouth of some sort

On the 26th day of incubation I note —Examined some sediment from No 3, and in it found an ovum of characteristic shape and colour with an embryo in it possessing considerable activity and plastic power It moved vigorously in the shell, and altered from time to time the shape of its body, which for the most part was heart-shaped, a distinct depression existing at the opercular end Contents of the body granular No vessel visible No cilia visible when in ovo, but on crushing the egg the ruptured embryo escapes, and its collapsed integument is then seen to be covered by long cilia, which keep in active movement for about one minute Examined No 4, and found several ova with active embryos of the same character Also No 1, but in it there appeared to be no advance in development (Figs 12-19)

On the 28th day I note —In all the glasses except No 1, the ova contain ciliated embryos If carefully expressed, the embryo retains its activity for 8 or 10 minutes after its escape It rushes off from the egg a globular ciliated rotating ball, as movement subsides, the body elongates, and a ciliated epidermis is seen to extend from the tail as far forward as the anterior third or shoulder of the animal The anterior part is naked, and at its apex is provided with a papilla or beak

The body of the animal evidently lies free in the shell, the cilia motionless at this stage and directed backwards If we watch the anterior part or head, which is always directed to the operculum, and for the most part closely applied to it, it is manifest that this is fixed in some way By careful examination of ova at a later stage of development, I have satisfied myself that this is effected by an involution of the delicate membrane lining the shell, which here becomes continuous with the ciliated epidermis of the body, thus the neck is surrounded by a sort of collar, which keeps it a fixed point (Fig 20) The movements of the animal during the last few days of its residence in the egg appear to be directed to rupturing this connexion, for the head is first turned forcibly to one side, then to another, expanded, contracted and jerked about, as if the little thing were annoyed and irritated by the collar restraining it When this has been ruptured the embryo moves about in the shell, trying in an excited sort of way to escape, the cilia vibrating rapidly Frequently, failing to force the operculum open, it turns completely round and energetically butts the opposite pole of the ovum with its head After a time it succeeds in opening the operculum, which is either carried completely off, and may be found lying at some distance, or is thrown back, as if on a hinge

If we rupture an ovum very carefully a week or two after the appearance of the cilia, and are successful in extruding the little animal without crushing its delicate tissues, it will

move away from the shell a short distance, its body elongating and contracting, and the cilia playing rapidly for a few minutes. Gradually all movements will cease, the body passing from heart-shape to spade-shape, the handle of the spade being represented by a minute papilla with a very fine canal, apparently opening at its apex. Now it may be distinctly seen that the ciliated epidermis does not cover the fore part of the body, only the posterior two-thirds, extending as far forward as the rounding in of the shoulder, also that the epidermis is in plates, one covering the tapered posterior end, and two other indistinct lines in advance of this, indicating that altogether there are three or four such plates or bands. Soon after extrusion the homogeneous or finely granular contents present larger globules containing actively moving granules, and as the feeble contractions of the body and ciliary motions cease, these granular globules increase in number, until finally the entire mass is made up of minute dancing micrococcus-like particles. Then the epidermic plates roll up, leaving the body quite naked, the cilia fade from view, and finally an amorphous mass is all that remains (Figs 14-19).

If, however, we rupture the ovum at a later stage of development, or if our observations are made just when the embryo has squeezed its plastic body through the natural opening, the behaviour of the embryo is somewhat different. First, the cilia are seen to start into rapid motion, and then after a preliminary pause to rupture and separate itself from the lining membrane of the shell which is sometimes forced out entire along with it, or, apparently to consider what has happened, the animal rushes off at great speed, gyrating about after the manner of certain infusoria. From time to time it pauses, contracting itself into a perfect disc or globe, rotating rapidly on its axis, first in one direction, then in another. Anon it dashes off to a distant part of the slide, exhibiting in its course many diversities of form. When going at high speed the body is much elongated, at a less speed oval or fiddle-shaped or square, but at no time is the beak or naked shoulder protruded as long as the animal is alive and active, a slight depression on the ciliated surface alone indicating where these are retracted. Beneath the epidermis is a thick contractile layer, the interior appears to be fluid or a soft jelly, holding minute granules in suspension, and sometimes a larger bright point can be detected. No vessel of any sort can be traced. I do not know how long the animal preserves this active ciliated form. I have kept one alive in a glass cell for over 24 hours (Figs 21-25).

Such, briefly, is the history of the first step in the development of *Distoma Ringeri*. The ova are laid into the bronchial mucus, in the sputum they are cast on the ground, by rain or other means they are carried to stagnant water, they sink to the bottom, in the course of six weeks or two months ciliated embryos are developed, when mature, these force their opercula and swim free in the water. What the next stage may be can only be conjectured. Doubtless they enter the body of some fresh-water animal to undergo further metamorphoses. Perhaps this animal is eaten by man, or possibly the parasites once more obtain their freedom, and, while still in the water, are swallowed, and thus obtain an opportunity of gaining access to the human lungs, their final destiny.

I have not spoken yet of the fate of the unwashed ova. The glass containing them was not disturbed for about three weeks. At the end of this time the sputum had decomposed, stank abominably, and had settled into two layers, one upper, more or less clear, and a lower,

Fig 1



No 1

Fig 2

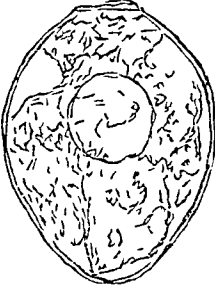
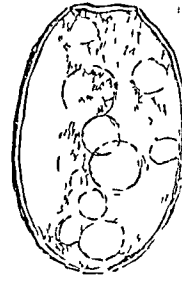


Fig 3



Fig 4



No 2

Fig 5

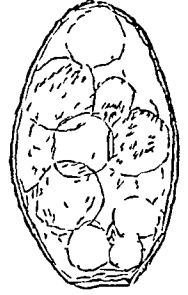
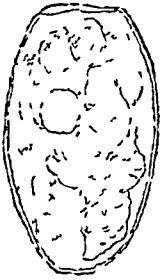
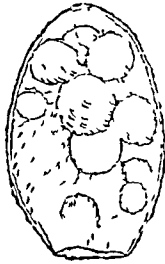


Fig 6



No 3

Fig 7



No 5

Fig 8



No 6

Fig 9

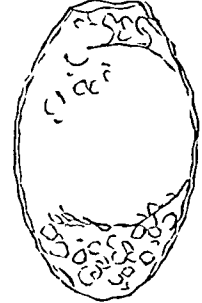


Fig 10

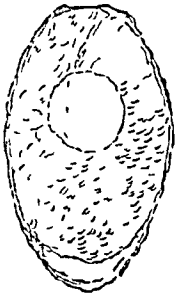
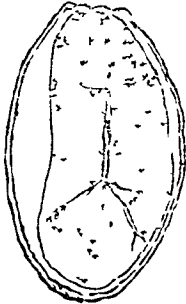


Fig 11



No 1

Fig 12

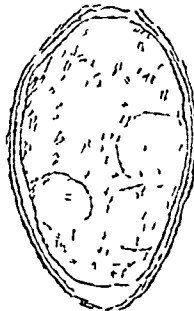
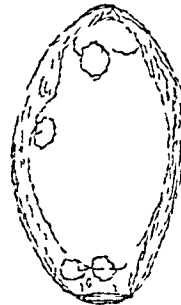
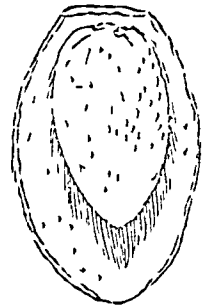


Fig 13



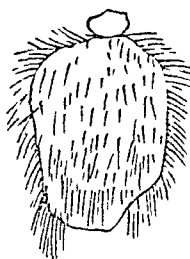
No 6

Fig 14



No 3

Fig 15



No 3

Fig 16

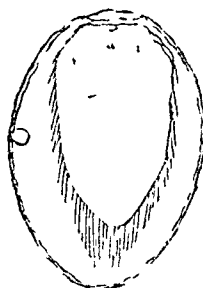
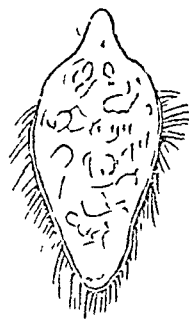


Fig 17



No 2

Fig 18

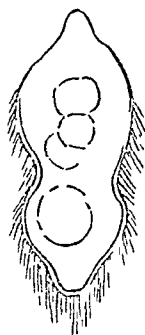
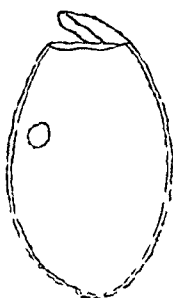


Fig 19



No 6

Fig 20



No 3

Fig 21

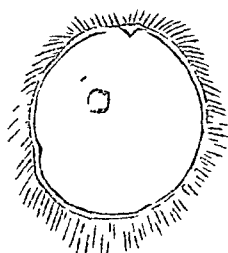


Fig 22

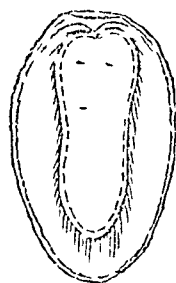


Fig 23

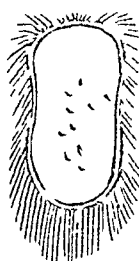
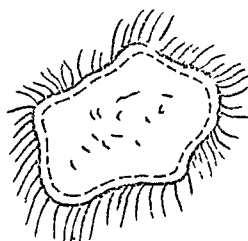


Fig 24



Fig 25



No 3

turbid and dark brown. On sampling the lower layer, into which the ova might be supposed to have gravitated, but few specimens could be found. These, however, were, as far as I could judge, in no way different from perfectly fresh specimens. The sputum was then washed repeatedly with fresh water. But although in the sediment ova were numerous, no decided advance in development could be detected, on the contrary, in many, signs of decomposition were apparent at the end of two months. In others, again, the characteristic globules of sarcodæ could still be distinguished. Thus it would appear that unless the ova are freed from mucus and have access to fresh water within a short time of their birth, they perish. If, however, water is supplied to them soon after they leave the lungs, though in limited amount, as was done in the case of glass No. 1, they do not rot, but retain their vitality, proceeding slowly in development. In the case of the ova in this glass the embryos were not differentiated till about the 40th day.

It is evident, therefore, that the ova must be brought into contact with water, and that this is the medium through which the parasite and the disease it produces pass from one human lung to another. In the history of this parasite we have another argument, if such is needed at the present day, for a pure water supply. Not many months ago there were few who would not have laughed at the idea that blood-spitting could be produced by a draught of dirty water. Now this connexion can be demonstrated. How many more diseases acknowledge impure water as one of the most important factors in their etiology, time and the advance of science will show. This matter of *Distoma Rugei* and parasitical hæmoptysis may have little practical interest for any but some 40,000,000 or 50,000,000 of Asiatics and the few hundreds of Europeans who live among them, but it is a valuable text for the advanced sanitarians of Europe to work on and preach from, to show that to-morrow some new fact may disclose unsuspected connexions between disease and uncleanness.

By these observations the search for the intermediary host is limited to a comparatively small group of animals. It must be an inhabitant of fresh water, it is common to Japan and Formosa, it does not inhabit or is rare on the mainland of China,—at least that part of it near Amoy. The latter circumstance has precluded me from pursuing the investigation further, but I trust it will be taken up and successfully completed by someone residing in Formosa or Japan, who, being in the midst of the disease, must enjoy ample opportunity. The limitation of the field in which investigation need be made must simplify the search, but that it will be a short and easy one does not follow. The history of the liver fluke, the cause of so much disease in sheep, is not yet complete, notwithstanding the great inducements and facilities offered to its investigators in Europe and elsewhere.

On discovering the cause of parasitical hæmoptysis, the first thought that suggests itself is the possibility of curing it. Could the parasite be killed, the disease would be arrested. An important point bearing on this question has yet to be ascertained, and that is the exact site of the parasite in the lungs. Is it free in the bronchi, or is it jammed into the branches of the pulmonary artery? If the former, the parasite may be dislodged, if the latter, the prospect of cure must be very small indeed. An autopsy is necessary to settle this point, and I trust our *confidés* in Japan will bear this point in mind when they get the opportunity. The exact position of the mature parasite could easily be ascertained by microscopical examination of

bronchial mucus, the appearance of ova in a particular tube would show that the animal is to be found by following up that lead

Proceeding on the assumption that the parasite had its habitat in the bronchi, I made several attempts in the two cases I have given to kill or dislodge it. I caused the patients to inhale the spray of solutions of various drugs atomised by a LISTER'S steam apparatus. In this way the tincture and infusion of quassia, the infusion of koussou, solutions of turpentine and santonine in spirits of wine were introduced into the lungs. In addition to these the man HENG inhaled the vapour of burning sulphur. Inhalation was practised twice daily for a week in one instance, and for a fortnight in the other. Certainly before these men passed from under my personal observation they were improved so far as cough and expectoration were concerned, but in both instances a small amount of ova-laden sputum could still be procured, irritating the lungs and inducing cough, they returned to Tamsui before I could be sure that the case was complete. In reply to my inquiries, Mr GRAHAM wrote me lately that HENG still spits small quantities of blood at long intervals, but that HEÔ has now no cough and can no longer bring up distoma mucus. He possibly is cured*.

I am sorry I have not been able to carry further these experiments in treatment. I would not allude to them now had I much prospect of being able to extend them. I mention them only in the hope that others with opportunities better than those I enjoy will pursue the inquiry in this very practical direction.

Our knowledge of the history of the ovum and the medium in which it is developed indicates the direction which effort at prevention should take. But I fear our knowledge in this instance is a little in advance of any prevention we may look for in a Formosan. Europeans who happen to be stationed in Formosa, or who may be travelling in the island, will understand from these remarks the necessity for extra caution with regard to drinking water. They should never neglect to boil or filter it when the least suspicion is entertained about its purity. A little neglect in this matter may be paid for with a chronic hæmoptysis.

* I had an opportunity of examining HEÔ three months after the attempts at cure above described. He said he was quite well, that he had lost his cough, had spat neither blood nor mucus, and that he regarded himself as cured. I caused him to inhale irritating substances, and thus forced him to cough violently, but he failed to bring up any trace of distoma sputum. He told me that my other patient, HENG, still spat blood, and he also brought me three specimens of ova laden sputum from three of his friends in Tamsui.

ON THE PERIODICITY OF FILARIAL MIGRATIONS TO AND FROM THE CIRCULATION

By PATRICK MANSON, M D

(*A Letter to Dr COBBOLD*)

* * * * *

Although in the paper I sent you some time ago I refrained from speculating on the cause of filarial periodicity (because I had nothing but guesses to offer), yet I have thought a good deal about what might be the reason of this most remarkable phenomenon, which, as you say, "savours of the marvellous" As Dr MORTIMER GRANVILLE remarks, it is well deserving the attention of physiologists, for could we ascertain what the subtle influence is that sets these creatures circulating in the blood stream and arrests them with such "military punctuality," we probably would let new light in on many an obscure problem both in physiology and pathology It was with the intention of providing myself with a standard with which to compare the results of observation and experiment that I prepared the chart I send you If it is published it may help others, who are willing to work on this subject, but who may not have the opportunities of the continuous observation it records

Dr MORTIMER GRANVILLE's ingenious speculations are based on the assumption that the phenomenon of periodicity depends in some way on sleep, either on the mechanical changes in the circulation when the body is in the recumbent position, or in the different proportions of oxygen in the blood, or in relative alterations of blood and tissue temperatures during the waking and sleeping states Now, as the embryos begin to appear hours before the usual time for repose, and are in no way sensibly affected by changes in the hours of sleeping and waking, it is evident that the power which fixes them and lets them loose operates independently of the sleeping state It is associated with the advent of night, but not of sleep

Part of Dr MORTIMER GRANVILLE's note is so much to the point that I will quote it—"The change of place may be fairly ascribed to change of state Looking at the habits of life in the lowest organisms, it can scarcely be supposed that the periodicity can depend on the state or requirements of the filariæ It is not likely that the parasite needs repose, or that it resorts to special localities to feed It seems more probable that the state of the circulating fluid determines the presence or absence of the filariæ in the main current by night and day respectively"

The first part of this I quite agree with, but the latter part I am not quite so sure about What is the difference between the state of the circulating fluid at 4 P M and 6 P M respectively? It is evident that something happens between these hours which liberates the embryos I do not know that physiologists have demonstrated or even supposed some sudden change beginning in the blood between these hours Again, the conditions permitting the free circulation of the parasites continue with increasing effect up to midnight, and the restraining influences which fix them are gradually reapplied from that time till they effect also complete fixation by 9 or 10 o'clock next forenoon What alteration in the physiological state of the blood or body generally corresponds to these hours? If you refer to my chart you will find no explanation in the rapidity of the circulation, nor in the temperature of the body For sometimes the pulse is quick when the embryos are numerous, and sometimes it is slow, sometimes the temperature fluctuates a degree without apparent effect on the numbers circulating

Whatever the cause may be it certainly operates *through* the body, the medium in which the parasites are, but I very much incline to think that though operating through the body it is placed *outside* of it.

Of one thing we may be quite certain—that from the fact of the periodicity being one of 24 hours its remote cause is the rising and setting of the sun, or rather the altered relation of the earth's surface to the sun recurring every 24 hours. Of another thing we may also be certain—that the immediate cause is applied between the hours of 5 and 7 P M. What, then, is the phenomenon in nature which, depending on the position of the earth's surface to the sun, begins to operate on the human body with the utmost regularity between the hours of 5 and 7 P M, increases in power up to midnight, wanes towards morning, and finally ceases to act between 9 and 10 A M? A correct answer to this would be a step towards the solution of this strange problem, only a step, however, for the method of its operating would still remain to be explained.

We may dismiss at once the diurnal variations of atmospheric temperature and pressure, for although, especially in these latitudes, these daily ranges are pretty constant, yet when completely inverted, as sometimes happens, and as you may see from a comparison of the chart and meteorological register, there is no corresponding disturbance in filarial periodicity.

In casting about for the answer two things occur to me—first, the rays emanating from the sun undergo about these hours marked alteration in their proportions and power, second, the magnetic condition of the earth suffers a change about the same time.

I am inclined to dismiss the former as the *direct* cause, for were the sun's rays the *direct regulating influence* we might expect to find the rhythm assumed by the embryos affected by the presence and absence of clouds and so forth. This is far from being the case, as you can see by comparing the chart with the meteorological register. The periodicity bears no relation whatever to the hours of sunshine, cloud, or rain, or other condition influencing the quantity or kinds of rays impinging directly on the human body, at least so far as I can see, but with terrestrial magnetism the case is quite otherwise. Its variations are rhythmical. If you consult authorities on the diurnal variations of the declination and inclination of the compass and intensity of terrestrial magnetism, you will find a marvellous correspondence between the rhythm of these phenomena and that of filarial periodicity. For example, the needle of the compass crosses the magnetic meridian, or mean daily position, between the hours of 9 and 10 A M and 6 and 7 P M, during the night and early morning the north end of the needle is to the east of the meridian, during the day to the west, and the hours when the meridian is crossed correspond pretty closely to the times of change from rest to activity and *vice versa* of the filaria embryos.

Again, the minimum of daily change of terrestrial magnetic intensity is between the hours of 10 and 11 A M, and the maximum between 4 and 7 P M, varying slightly with the season of the year. These hours correspond very closely with those of commencing rest and activity of the filaria in the normal state of the body. There is no proof whatever that there is any cause and effect relation between these two phenomena, but the coincidence is most striking, and suggests further investigation. If experiment should show such relation it would be interesting to know if the cause operated directly, or if the effect on the embryos depended on physiological changes in the body, the result of terrestrial magnetism.

These may seem wild and unjustifiable speculations, but I only offer them for what they are worth, and desue to separate them by a clear and well defined line from my facts. But the imagination has its place in science, I believe, as well as rigid observation and induction. At any rate, actuated by these speculations, I have made one or two crude and unsuccessful experiments. I wish very much some expert in physiology and electricity would take the matter up. My knowledge is so limited, and the apparatus I can command so rude, that I despair of being able to give the answer myself. I believe a systematic examination of the compound force called light, and of terrestrial magnetism in their influence on these worms would give most valuable results, not only in solving this most interesting problem, but in opening new and fertile fields in physiology and pathology.

I do not anticipate much from observations on the disturbing effects of drugs and the febrile state. These undoubtedly in the future will be found to have an influence on filarial periodicity, and it is possible

I.

DATE	
Hour	4
110	
100	
90	
80	
70	
60	
50	
40	
30	
20	
10	
0	
Temp under tongue	
100°	
99°	
98°	
Pulse per minute	
85	
80	
75	
70	

II.

DATE	
Hour	4
160	
150	
140	
130	
120	
110	
100	
90	
80	
70	
60	
50	
40	
30	
20	
10	
0	
Temp under tongue	
104°	
103°	
102°	
101°	
100°	
99°	
98°	
Pulse per minute	
90	
85	
80	
75	
70	
Thermom	
85°	
80°	
75°	
Barom	
30	
20	

At 1000 ft

this study may lead to just conclusions as to the cause of the phenomenon. It is not likely, however. The conditions of experiment become in such cases almost too complicated to unravel. We must be careful to bear in mind that substances or forces which interfere with the periodicity may have nothing in common with its normal cause. Assuming that quinine has this power, it would be absurd to infer that the presence or absence in the blood of this drug had anything to do with normal periodicity. It is only by the exclusion or inversion of the cause that we may hope to arrive at correct conclusions.

I have written more than I intended about my speculations on this subject. The great interest you take in these matters is my excuse, and I hope you admit it.

I will leave speculation alone now, and pass to the facts in explanation of the chart I have sent you.

The chart records a series of observations on the blood, temperature, and pulse of two Chinese lads ascertained to be filarious, and were in the main made by themselves. After enlisting them in the cause, and before commencing systematic observations, I trained them to recognise and count the embryos with the microscope, to read accurately the clinical thermometer, and to record correctly this and observations on the pulse, barometer and ordinary thermometer. I took care from time to time to satisfy myself that their observations were carefully made and recorded, and I believe if there are any errors in the chart they are few and unimportant. Observations were made every three hours, day and night, during one month. At first the hours selected were 12, 3, 6, 9, 12, 3, 6, 9, but after two days it was found convenient to change them to 1, 4, 7, 10, 1, 4, 7, 10. The quantity of blood was as nearly as possible the same in each examination, just sufficient to form a thin workable film fully occupying a covering glass $1\frac{1}{2}$ in. by 1 in. The inevitable differences in the quantities examined probably accounts in part, at least, for discrepancies in the number of embryos found at corresponding hours on different days. Notwithstanding this unavoidable imperfection, the microscopical observations serve their purpose, and in the main may be relied on. The same clinical thermometer was used throughout, and by both lads. The instrument, I found on comparing with two others, is too high set, this circumstance explains the range of normal temperature being in the 100th instead of the 99th degree as is usual.

Food of the kind usually consumed by middle-class Chinese, viz., rice, a little pork or beef, salted and fresh fish and vegetables, was taken at 7 A.M., 1 P.M. and 7 P.M., or thereabouts.

Sleep during the night was constantly interrupted to take observations, and consequently was frequently indulged in during the day.

The meteorological observations recorded in the chart were made with an ordinary large aneroid barometer, with thermometer attached. The instruments, though good enough for the purpose in hand, are probably not perfectly reliable. I have accordingly procured from the Customs a copy of their meteorological register corresponding to the period of these observations. This is very accurately kept, and may be trusted, with the exception of the afternoon readings of the thermometer. In consequence of the faulty position of the instrument they stand 3° too high during the afternoon.

Both lads come from Hooihorb, a filarious district, some three days' journey to the north of Amoy. They have resided in Amoy but a very few months. LI KHA (I in the chart) is 21 years of age, of average size, and in good health. He has no history of fever or any serious disease. TIONG SENG (II in the chart) is 21 years of age, and is fairly well nourished. When about 14 he had what he called ague (what I call lymphatic fever), and from that time till now has on an average an attack about once a month. The attacks begin with giddiness, weariness of the body and limbs, this gradually merges into a cold stage, with moderate rigors of two or three hours' duration, then succeeds a hot stage of very high fever of 24 hours' duration, terminating in moderate diaphoresis, lasting for an hour or two. The fever is accompanied by complete anorexia, and during its continuance the inguinal and femoral glands invariably swell up and pain him excessively, those on the right side being afflicted more than those on the left. Unless the attack of orchitis or inflammation of the tunica vaginalis, to be hereafter alluded to, he has

never had any trouble about the genitals or limbs, nor any signs of elephantoid disease. There is manifestly nothing of an ague type about these fever attacks. Though recurring about once a month (he had another attack without orchitis, however, on the 18th and 19th August) they are single, not quotidian, tertian or quartan.

The first three compartments on the chart refer to LI KHA (I), the second three to TIONG SENG (II), and the two lowest are occupied by readings of thermometer and barometer. At the margin are numbers referring to number of filaria found, temperature of body, beats of pulse per minute, etc. Along the top the figures refer to the date and the hour of the day.

One or two things require a little explanation. The effect of the *febrile state* is well shown in the case of TIONG SENG (II). From the 12th July, when systematic observation commenced, till the afternoon of the 16th he was in his usual health, though his temperature ranged rather high, and the filarial rhythm was perfect. At 1 P.M. on the 16th, after being out of sorts all the morning, he had a rigor, followed by rapid rise of temperature and smart fever, at 4 P.M. he took 5 grains of quinine, by 10 P.M. inflammation of the right tunica vaginalis, with effusion and perhaps orchitis, declared itself, and the groin glands had become painful and swollen. Next day he was quite confined to his bed, inflammation continuing. He took three doses of quinine of 5 grains each during the day. On the 18th fever and inflammation had subsided, and he took only two doses of quinine. On the 19th the fever and inflammation relapsed, and he had an attack of a sort of convulsive hysteria, that day he had three doses of quinine. On the 20th he was better, and on the morning of the 21st was entirely free from pain and fever. The swelling of the testicle and glands gradually subsided. Contrast the behaviour of the thermometer and of the embryos during and immediately after the attacks. The disturbance in periodicity did not begin for some time after the thermometer had risen, and it continued for days after the temperature had fallen to the normal standard. My inference is that the mere elevation of temperature has not *per se* any effect on the periodicity, it would show at once were this the case, chemical or other pathological changes consequent on the febrile state have an effect, and until these changes are eliminated or subside, filarial rhythm is interfered with. The effect of the fever seems to be to prolong the periods of remission, to diminish the number circulating at the time of maximum, and prevent complete fixation at any time.

As the quinine taken during the attack might have had some disturbing influence, I tried the effect of a large dose on LI KHA (I) on 26th July. 30 grains were taken in three doses of 10 grains each at intervals of one hour, beginning at 10 A.M. On the following day you see the pulse rose, the temperature fell, and comparatively few embryos could be found circulating, and their ingress that evening appeared to be delayed, but by 1 A.M. on the 28th they were as numerous as ever, and thenceforward periodicity and numbers continued as before the experiment. I cannot say, however, that this slight perturbation was the result of the quinine, for TIONG SENG (II) was treated exactly in the same way on the 29th, but periodicity and numbers were in no way affected.

Nitrate of amyl (15 drops) was inhaled by LI KHA (I) at 10 A.M. on the 25th. There were no embryos in the blood when inhalation commenced, shortly afterwards 2 were found in one slide, 3 at 1 P.M., 2 at 4 P.M., 0 at 7 P.M., 18 at 10 P.M.

Santonin (4 grains) was given to LI KHA (I) at 10 A.M. on the 29th, and the same dose at 7 P.M. No effect apparent.

Turpentine spray inhaled by LI KHA (I) at 10 A.M., 1st August. No result.

Quassia tincture spray inhaled for 11 minutes at mid-day 1st August by TIONG SENG (II). No result.

Besides these I have tried one or two experiments with electricity, but they proved barren, and need not be detailed.

Referring again to your Quekett Club communication of 27th February, I would ask you if Dr. BANCROFT has published his observations on the dog louse as intermediary host of *Filaria immitis*?

Unless he has observed metamorphosis of the embryo in the louse's stomach it is premature to conclude that this is the intermediary host. Did the louse play the rôle he assigns to it? then we might expect to find *Filaria immitis* in the dog in all countries where the louse is found. The intermediary host is, I fancy, the principal element in determining the geographical spread of such parasites. A little reflection soon convinces one of this.

Before concluding this letter I would suggest that Dr SOMERVILLE's statements about the habits of the Chinese with regard to the use of drinking water should not be received until he or someone else has given us the details of the investigations that have led him to the conclusion that the Chinese do not drink uncooked water. I have been many years in China and mix a good deal with the people, and the outcome of my experience is that, like other people, the Chinese drink water when they are thirsty and can get nothing better. It is quite true that with a certain class of Chinese there is prejudice against drinking cold water, but it is only the richer classes who can afford to act on such prejudices. I asked a Chinese friend, "Do your countrymen often drink cold water—the farm servants and coolies?" "Certainly," he said, "all drink water if thirsty on the hill side or in the fields, what else can they get to drink?" Only a day or two after reading Dr SOMERVILLE's letter I asked 10 consecutive patients as they passed through the hospital consulting room about their drinking habits, and these are the answers to my question, "Do you drink cold water?"

I Case of elephant leg, a paperhanger—Before my disease began I drank cold water daily, especially during the hot weather

II Case of bruise, a boatman—When thirsty I always drink cold water

III Case of leprosy, a boatman—When younger, and before falling ill, *ie*, till I was 12 or 13 years old, drank cold water in hot weather. Since my leprosy commenced never drink cold water, always tea

IV Case of fibro sarcoma, farm labourer—I generally drink cold water, sometimes tea

V Case of bruised and lacerated lip, idol paper maker—I generally drink tea, once in 10 times drink water, when young I always drank water

VI Case of scabies, a comb maker—Seldom drink, when very thirsty generally drink water, sometimes tea

VII Case of flat feet, a blacksmith—Generally drink tea, very rarely water

VIII Case of leprosy, pedlar—When young I drank water daily, now generally drink tea, water seldom

IX Case of dyspepsia, pedlar—When young drank water, since becoming dyspeptic never take fluids

X Case of bruise, shopkeeper—I generally drink tea or rice water, sometimes drink water

There happened to be nine lads, assistants and dressers, in the room when I interrogated these patients. Turning to them I asked them individually if they drank water, one and all confessed to being guilty of the habit, and seemed very much astonished that anyone should doubt it.

Foreigners are not so partial to water-drinking as are the natives, at least when water is drunk it is usually qualified with wine or spirits, and aerated waters of different kinds are in general use. The most careless foreigner and the total abstainers seldom drink unfiltered water, and if filtration cannot exclude an animal at least the thirtieth of an inch in length, the passing of water through a filtering apparatus must be regarded as a meaningless ceremony.

It is to be regretted that Dr SOMERVILLE has not been more explicit as to the number of natives whose blood he has examined for filaria. Dr RENNIE, of Foochow, writes me he frequently sees the parasite in his hospital cases. Readers of LEWIS' earlier papers will remember the warning he gave, foreseeing such criticisms as Dr SOMERVILLE's. He says, referring to accounts of chyluria cases, "such remarks as this will be frequently recorded, 'Filaria searched for but not found,'"—or words to that effect.

If the examination of filarious blood is made during the night it is almost as easy to find the parasite as it is to find a white blood corpuscle. Seeing this, and the frequency with which the presence of the parasite is associated with lymphatic fever, elephantoid and other disabling affections, I have sometimes thought it would be worth the trouble for the Government in India to institute the systematic examination of the blood of native recruits by their medical officers. I am satisfied that by the rejection of filarious subjects much invaliding and expense might be avoided, and that, too, at very little trouble. At any rate, much useful information might be got together, and such an idea might be profitably ventilated by Sir JOSEPH FAYRER or some other Indian authority.

APPENDIX.

THE following reproductions of some recent papers on pathological questions which are of special interest to the medical profession in China are here brought together as fitly supplementing, and in some instances explaining, clinical facts of daily observation which existing conditions often render difficult of interpretation —

ABSTRACT OF A PORTION OF A PAPER READ BEFORE THE INTERNATIONAL MEDICAL CONGRESS OF 1881, ON THE RELATIONS OF MICROSCOPIC ORGANISMS TO SPECIFIC DISEASES

By Professor KLEBS of Prague

THE general morphological law, under which every difference of form corresponds to a difference of function, and the only diversity evidenced by any single series of identical forms lies in the functional activity of its members, is as true in the case of those inferior organisms which are found in the body under pathological conditions as it is in all other cases. Observation proves that identity of parasitic form corresponds exactly to identity of pathological process.

Three groups of microscopic organisms are found in the infectious diseases which attack animals, including man. These are *hyphomycetes*, *algæ* and *schizomycetes*. These groups present as regards development varying aptitudes, depending partly on their ordinary or normal conditions of existence, but more especially on their power of adaptation, which, as DARWIN has demonstrated, is common to all living beings, and lies at the origin of the production of new species endowed with new properties.

A —The *hyphomycetes*, in consequence of the quantity of oxygen which they require, occasion but a small number of morbid processes, whose seat is generally superficial, *eg*, favus, herpes circinatus, thrush.*

B —Among *algæ* it is hardly necessary to mention more than the leptothrix, which causes concretions not only in the mouth, but in the salivary ducts, and in the bladder. The sarcina of GOODSIR may also be named. It is worth while to remark that, with respect to their morphological and vegetative relations, many schizomycetes, and particularly the group of bacilli, are allied to the *algæ*.

C —The *schizomycetes* are, however, the organisms which account for the largest group of infectious diseases. They may be divided into two series morphologically distinct from one another, *viz*, *bacilli* and *cocco bacteria*.

a *Bacilli* present the appearance of filaments in the interior of which spores develop, these latter, after escaping and under favourable conditions, reproducing filaments. Much oxygen is required for the development of these organisms, and particularly for the formation of spores. There is a long list of

[* D'une manière générale, je dois faire observer que les parasites aërobie ont quelque peine à se cultiver dans le sang, tant que les globules de celui-ci sont en bon état physiologique. J'ai toujours pensé que cette circonstance s'expliquerait par une sorte de lutte entre l'affinité pour l'oxygène des globules du sang et celle qui est propre au parasite dans les cultures. Tant que les globules du sang l'emportent, c'est à-dire s'emparent de tout l'oxygène, la vie et la multiplication du parasite deviennent très difficiles ou impossibles. Il est alors facilement éliminé ou digéré, si l'on peut dire ainsi. — PASTEUR, *Comptes rendus de l'Académie des Sciences*, 3 Mai 1880.]

diseases in which bacilli play a part —Malignant pustule (KOCH), malarial affections (KLEBS and TOMMASI-CRUDELI), typhoid (KLEBS, EBERTH), typhus (KLEBS, unpublished observations), swine cholera (KLEIN) To these must be added the *bacillus leprosus* discovered by NEISSER All these diseases have one character in common They are due to influences arising more or less directly from the soil, which, however, does not exclude their transmission from individual to individual Perhaps cholera and yellow fever should be included in this group, as our present knowledge appears to indicate that they are of telluric origin Alongside of these general infectious diseases stand local affections indicative of the presence of these organisms in the diseased region As an example, bacillary gastritis may be cited

b The second group of pathogenic schizomycetes has received from BILLROTH the name of cocco-bacteria, on the ground that it is constituted by masses of micrococci capable of transformation into short rods Two genera may be distinguished *microspores* and *monads* In artificial cultures the former, needing a medium poor in oxygen, are found at the bottom of the culture fluid, while the latter, requiring a medium rich in oxygen, are found at the surface Among the affections produced by microspores must be enumerated the septic processes and true diphtheria To monads are due a vast series of diseases which, according to their clinical symptoms and anatomical lesions, may be classified as inflammations, acute exanthems, infecting tumours and leucocytozes The inflammatory processes under their control are mainly those which do not commonly terminate in suppuration Such are rheumatic affections with concomitant or consecutive cardiac, renal and hepatic lesions leading to the formation of connective tissue rather than to that of pus, croupous pneumonia, erysipelas, certain puerperal affections, and mumps The acute exanthems belonging to this group are small-pox, vaccinia, scarlatina and measles The infective-tumours are represented by tuberculosis, syphilis and glanders

Of all micro-organisms, cocco-bacteria are those whose presence is most difficult to demonstrate in the affected tissues According to the ascertained seat of predilection of each organism, investigation into its biological relations should be directed in turn to animal tissues, to soil, to air and to water

[Memorandum.—COHN's process for the investigation of tissues supposed to contain micro-organisms has been adopted by HANSEN, CORNIL, SUCHARD, and MALLASSEZ It is as follows —The specimen is hardened in absolute alcohol and cut into thin sections These are plunged for 24 hours into a $\frac{1}{1000}$ solution of methyl-anilin violet, after which they are found to be uniformly stained a deep and opaque blue They are then placed for half an hour in a $\frac{1}{20}$ solution of carbonate of soda, and subsequently transferred successively through alcohol baths of increasing strength up to absolute alcohol until they are thoroughly dehydrated By this time they are greenish, with a blue border The next step is to immerse them in essence of cloves, which must be renewed from time to time as it becomes coloured The moment is seized when the section loses its general tint, leaving the micro organisms stained, while the contours of the tissue elements look as if they were suspended in a translucent jelly The section is thereupon mounted in commercial Canada balsam]

A CONTRIBUTION TO THE PATHOLOGY OF MALARIA INFECTION

By Dr B AFANASSIEW

(Vnchow's Archiv, 1881, II, 13)

DURING the last war, while the Russian troops were stationed south of the Danube and in Transcaucasia, they were frequently attacked by intermittent fevers, of which various marked traces and relics persisted in many patients even after their return home. I was thus enabled, by means of the autopsies performed last year in the Nikolai Hospital, to observe alterations in various organs clearly indicative of the characteristics of chronic malarial infection. The changes in the spleen, liver, kidneys, and brain offered the following appearances —

The spleen was enlarged, the capsule thickened and often united with surrounding structures by means of old pseudo-membranes. On section the tissue was firm and of a dark slate grey colour. The firmness of the organ was exclusively due to hypertrophy of the areolar tissue of the trabeculae, while the grey discolouration was caused by a deposition of dark brown pigment, disposed in granules and in heaps, which for the most part lay free in the tissue. It was, however, occasionally observed that the accumulation had taken place in the smaller vessels, whose lumen was thus crammed with black masses. Of the lymphoid corpuscles some were frequently found which contained dark brown round granules in varying amount. Many cells were completely filled with masses of the same kind, and in such cases they were enlarged to double their normal dimensions.

The liver was invariably shrunken whenever death had occurred in consequence of malarial cachexia. When malarial disease was complicated by croupous pneumonia or with any typhoid condition, the liver was enlarged, its tissue was firm, creaking under the knife, and displaying the same grey discolouration as the spleen. Microscopic examination showed a fairly uniform hypertrophy of the connective tissue between the acini as well as between the separate liver cells. In uncomplicated malarial cachexia the hepatic cells were shrunken, their protoplasm containing partly fat globules and partly yellowish-grey pigment. Cells with dark-brown pigment were extremely rare. The latter filled especially the capillaries of the liver, a fact of which one could assure oneself by the examination of pencilled sections. In one section thus prepared the filling of the capillaries with blackish-brown granules was clearly seen, while in the tissue, pigment lay free and in much smaller quantity.

The kidneys were shrunken, hard, yellow, and under the microscope exhibited distinct hypertrophy of the connective tissue between the canaliculi, chiefly in the medullary cones. The epithelium of the urinary tubules was granular, but the contours of the cells were well preserved, and only in rare cases were the convoluted tubes completely filled with granular masses, partly fatty and partly albuminoid. The dark brown granular pigment lay mostly in the form of single grains in the vessels of the cortical substance. It was to be seen somewhat more closely agglomerated in the vessels of the Malpighian bodies. But on the whole, the renal tissue contained absolutely insignificant quantities of these dark brown granular masses in comparison with the spleen and liver.

The brain was in all cases bloodless and pasty. Microscopically, it showed the cells of the grey substance in the cerebral hemispheres surrounded by wide spaces. The cell protoplasm was granular, but the nucleus was always plainly discernible. The capillaries were mostly normal, but sometimes their coats were granular, the endothelium in such cases projecting somewhat into the lumen. Pigment granules were sometimes found singly in the capillaries with granular tunics, either in the lumen or in isolated endothelial cells or in the perivascular spaces.

On the whole, tissue changes in chronic forms of malaria are expressed by the following typical phenomena —hydræmia, connective tissue overgrowth, chiefly in the abdominal organs, formation and deposition of a special pigment in the spleen and liver. In some cases death or symptoms menacing to life may be caused by various complications which, however, are connected with the malarial intoxication.

Thus, the liver capillaries compressed by hypertrophied connective tissue and obstructed by pigment become impermeable, laying the foundation for one form or another of liver disease, which develops itself in subservience to the malarial infection. Or through the spleen causes are brought into operation which produce general peritonitis as the consequence of perisplenitis or of the softening of an infarct and rupture into the abdominal cavity. Or there may be developed in the kidney some form of Bright's disease, or amyloid degeneration, or the Malpighian bodies may be obstructed by pigmentary deposit, and death ensue with symptoms of arrested renal function. It is therefore impossible to make the occurrence of so called pernicious intermittent fever dependent on any defined anatomical lesions. More especially would it, I think, be a serious error to attach any great weight to melanotic pigment in the origination of the different threatening symptoms which develop themselves in the course of severe forms of malaria. In all my cases, at least, though melanosis of the various organs was very conspicuous, it counted for nothing in the production of the fatal result. It is possible that in some rare instances pigment might by obstructing the vessels lead to disordered function of certain organs, but it is only exceptionally that it can be made answerable for the fatal issue. The reason why every change observed in pernicious intermittent is referred to pigment probably is, in the first place, that in anatomical investigations the pigment is the most striking phenomenon, and secondly that, even should they depend on something quite different, there is nothing easier than to explain simply by embolism the most diversely disordered actions. In proof of this let me be permitted to cite a case wherein, during an attack of intermittent fever, death occurred with severe brain symptoms.

On superficial examination of the brain it seemed natural to refer the observed cerebral hyperæmia and œdema to pigmentary obstruction of the brain capillaries. But a more careful investigation proved that pigment, although present in large quantity, could have played but a small part in producing the grave cerebral symptoms. On account, moreover, of the interest which the case otherwise offers, I take the liberty of relating it somewhat at length.

On the 23rd September Sergeant ADRIAN FEDEROFF, 33 years old, was admitted to the Nikolai Hospital. In the report of his case the following particulars were noted, among others: "The patient is unconscious, wasted and anæmic, pupils dilated, pulse irregular, intermitting, breathing superficial. He fell sick yesterday (22nd). After (23rd) a convulsion he became unconscious. Next day (24th) he remained unconscious. The temperature was increased, to the touch, pulse fuller and more regular. In the evening consciousness returned. Temperature in axilla, 38° 5. Profuse sweating during the night, but soon afterwards the temperature rose again, and the patient once more lost consciousness. On the 25th the temperature was 39° 5 and the pulse small, inability to swallow, râles in chest, eschars had formed on both trochanters. 26th September, at 1 P.M., death."

Postmortem, two days after death—Diploe of vault, hyperæmic, pia mater much thickened, cloudy and œdematous, much serous fluid escaping on section. The brain substance was moderately injected and soft, lateral ventricles distended with serous fluid, cortex chocolate colour, vessels of base cloudy and slightly sclerosed. Lungs not adherent, parenchyma full of air, but deeply pigmented and œdematous. The heart was enlarged, its muscular substance flabby, walls thin, cavities dilated. The muscle was yellow, valves unaltered. The right side was filled with loose clots. The liver was much enlarged, its parenchyma pigmented and throughout chocolate colour. Spleen enlarged (13 inches in length), its tissue rather hard and dark slate colour. The mucous membrane of the stomach as well as of the small and large intestines presented no noteworthy alterations. There were eschars on both trochanters, each a palm broad. The organs removed at the autopsy were examined partly in the fresh state, partly after hardening in Muller's fluid and alcohol. In the former case specimens, mostly teased, were prepared by immersion in a three fourths per cent solution of chloride of sodium, while thin sections prepared from the hardened preparations were examined in glycerine.

It was easy to distinguish the separate vessels in teased preparations of the grey substance from the cerebral hemispheres, some were enlarged and stuffed with blood-corpuscles. There was no noticeable alteration in the structure of their tunics, but small brilliant corpuscles were sometimes visible in certain of the smaller arteries at the origin of the minuter branches.

Here and there among the contents of the vessels large round granular cells were found between the red corpuscles. In the protoplasm of these cells black pigment was seen sometimes in single granules and sometimes in heaps. Other vessels, especially the capillaries and veins, contained no red blood-corpuscles, their tunics, however, exhibited various changes. Sometimes the endothelium was greatly swollen and granular, this swelling going occasionally so far that the lumen of the capillaries was altogether obliterated. The adventitia of the venous trunks was in places infiltrated with round cells. In other cases the capillary walls presented the appearance of finely granular homogeneous cylinders in which it was impossible to distinguish either the contours of the separate endothelial cells or their nuclei. Then again there were capillaries which in some places showed varicose enlargements. In the lumen corresponding to these portions, round granular forms were piled up containing black pigment either in single granules or in heaps. Often it occurred that in one capillary vessel several granular cells were heaped up and fused together, thus forming in the lumen large thrombi consisting of a granular, dimly shining, uniform mass, hardly permitting the definition of the contours of the separate cells. Acetic acid cleared the preparation and caused the granular cells to swell slightly. As regards the single, isolated, pigment granules, they were perfectly round, nearly all of the same size, and, under transmitted light, exhibited a brownish shining centre. Where the pigment was piled up variously formed heaps and lumps were seen. Some lumps were cylindrical, but when broken up by pressure or by the application of concentrated acids, they fell into perfectly uniform round grains, similar to those found distributed singly in the vessels. When by teasing, a vessel with its ramifications was successfully isolated, it was easy to assure oneself that the above-described changes in the capillary walls did not extend throughout the entire vessel, but were restricted to certain parts. Some vascular branches had perfectly normal walls, and contained red blood-corpuscles. Others, again, were altered only in places, and here there was invariably either heaping up of pigment, or formation of thrombi by the aggregation of white blood corpuscles, or granular swelling of the endothelium. Like changes were found in the vessels of the white brain substance, though here, on the whole, normal vessels predominated. Thin brain-sections showed in certain places marked blood congestion. In the neighbourhood of these parts the neuroglia cells were increased in number, but in spite of the most marked vascular congestion, I could never discover a migration of red blood-corpuscles either singly or in the form of an extravasation. On the other hand, elsewhere in the same preparation, vascular congestion fell into the background, many capillaries containing absolutely no blood-corpuscles. Their walls were infiltrated with finely granular pigment, and the above described changes could be observed in them. In every section I found swelling of the endothelium in various stages of progress, and granular degeneration of the capillaries. As regards granular pigment, this was chiefly found in vessels with altered walls, single granules, or heaps of them, lying, either free in the lumen, or in the protoplasm of the swollen endothelium, or outside the vessels in the perivascular spaces. The neuroglia itself was for the most part free from pigment, single granules being but rarely found in it. In successful sections it was not uncommon to be able to follow up a capillary for a considerable distance. It might at first be normal, and contain red blood corpuscles. Gradually it would enlarge, the endothelium meanwhile manifestly projecting into the lumen. Then would follow a knot-shaped enlarged portion containing one or more round granular cells. In its further course the vessel either diminished to its normal diameter and appearance or assumed the form of a finely granular cylinder. The knot-like enlargements, with the round cells found within them, were at the same time the seat of the greatest deposit of pigment, which was found partly free, partly embedded in the cell protoplasm. In some cases the knot-like enlargements attained a considerable size, and were filled with a uniformly granular mass infiltrated with dark brown pigment, in which mass it was only now and then possible to distinguish the contours of the single round cells or of the swollen endothelial elements. It was mainly in the grey cortical substance that the alterations just described of the vascular walls and of their contents were most clearly manifest. In the white brain substance they were only rarely found, yet here hyperemia was more marked. The nervous elements of the grey substance were altered in various ways. The greater number contained finely granular cloudy protoplasm, which, however, allowed the nuclei to be distinguished. Many cells were surrounded by empty spaces of greater or less size, so as to give the impression that each cell was forcibly separated from its connexions. Comparative examinations of various other brains proved that this phenomenon is to be found chiefly in cases of cerebral oedema. In other nerve cells the protoplasm was quite granular, and the nucleus indistinguishable, the pericellular spaces were at the same time hardly visible, due probably to the swelling of the protoplasm. Here and there, nerve cells were found whose protoplasm contained variously sized granules of yellow-brown pigment, a condition not uncommon in many chronic affections of the brain substance.

The accumulation of blackish-brown pigment in the liver tissue sometimes reached colossal proportions. In each section were then found variously sized and variously shaped lumps deposited partly among the acini, but mostly among the liver cells. When thin sections were washed and pencilled a connective matrix was brought to light, in which the capillaries generally contained pigment lumps, while it was only rarely that pigment was found free in the connective tissue itself. The liver cells were enlarged and finely granular, the nuclei being not clearly distinguishable in every cell. Only a few exhibited lumps of black pigment, for the most part there was a deposit in them of variously sized yellow-brown pigment granules similar to those commonly found in cases of blood stasis in the liver. This pigment was clearly distinguished from the dark brown melanotic pigment by the fact that the latter consisted of single, equal-sized, uniformly round granules provided with a brilliant centre. The masses arrested in the capillary lumina were in the highest degree rebellious to the action of all reagents. When firmly pressed they fell into single granules of uniform appearance and size, just as I described the conduct of the pigment in the brain capillaries. The connective tissue was increased as well between as among the hepatic lobules.

In the spleen the distribution of pigment was irregular. It lay mostly in the red pulp in the form of large, variously shaped lumps. In the trabeculae as well as in the Malpighian corpuscles it was found in small quantity, distributed in single granules or in small piles. The lymph corpuscles of the spleen were of various sizes. Many were enlarged, and contained considerable quantities of dark brown pigment granules, recalling very vividly the cells found in the brain capillaries. Others, again, were free from pigment, and presented nothing abnormal. The connective tissue was increased.

In the cortical substance and pyramids of the kidneys the interstitial connective tissue was increased. The epithelium of the convoluted tubes was cloudy and granular. The contours of the separate cells were plainly visible, only here and there tubes were found filled with a finely granular mass. The renal vessels showed no alteration, single pigment granules being but rarely found in their lumina. Accumulation of pigment was noticeable exclusively in the capillary loops of the Malpighian coils, and even there it did not occur to any great extent, and was confined to isolated regions.

These alterations of the different organs in the case just described enabled me to diagnose (so called) pernicious intermittent fever with cerebral symptoms.

In the literature of the subject a widely varying nomenclature is adopted for the form of disease in question. According to the manner in which cerebral symptoms declare themselves during life, we have to do with "comatose," or "apoplectic," or "epileptic," or "maniacal," or "soporose," or "tetanic," or "hydrophobic," or "cataleptic" intermittent fever, and so on, without being able to link any definite anatomical changes with these denominations. Formerly the cause of the symptoms was sought for in the specific operation of blood poisoned and altered by malaria on the brain centres, and in a nutritional disturbance of the brain thereby caused. Or it was fancied that, as a consequence of blood pressure, hæmorrhages and exudations occurred which paralysed the functions of the centres. MECKEL gave a more exact explanation of the cerebral symptoms developed in the course of pernicious fever. Relying on his discovery of granular pigment in the blood of those severely stricken by forms of malaria, he called attention to the possibility of obstruction of the brain capillaries by the products of disintegration of red blood-corpuscles. He at the same time remarked that disturbances in the cerebral circulation, and capillary hæmorrhages may depend on capillary obstruction, and may thus account for the different brain symptoms noticed during life. These observations were confirmed by later investigators (especially by PLANER, FRERICHS, HESCHL, and others), and supported by a great many fresh cases. At the same time it was proved, chiefly by FRERICHS' papers, that while, on the one hand, cases occur of great pigmentary accumulation in the brain without symptoms, cerebral forms of malarial intoxication are, on the other hand, often enough observed in which there is no sort of pigment accumulation to be found either in the brain itself or in its capillaries.

Thus it came to pass that the belief in the importance of pigment and of cerebral embolism was soon seriously shaken by the attempts made to explain by them the occurrence of cerebral symptoms in the course of intermittent fever. GRIESINGER, FRERICHS, and others, relying on the disturbance of renal function, and on the discovery of a blocking of the vascular network of the Malpighian coils by pigmentary accumulation, and appealing to the alteration of the renal tissue in Bright's disease, conjectured that there

might be a causal connexion between brain affections and uræmia. Later on, LEBERT drew attention to the fact that in countries where malignant malarial fevers are prevalent, brain symptoms manifest themselves, and a fatal result occurs during the earliest paroxysms of fever, and therefore at a time when there could hardly be any question of profound blood change. These observations and the ascertained fact that cerebral symptoms of a typical kind occurring in intermittent fever are successfully combated by quinine led F. NILMEYER to repudiate any connexion between these symptoms and obstruction of the cerebral vessels by pigment. It is, he says, possible that the poisoning of the blood by marsh miasma may cause brain symptoms contemporaneous with, but certainly independent of, accumulation of pigment. HERZ, in ZIEMSEN'S *Handbook* first remarked that although some authors are wont to link many serious alterations of organs and dangerous brain symptoms (delirium, convulsions, sudden death) with the presence of pigment in the blood, still it is not quite justifiable to derive all the brain symptoms from it, for pretty often where severe cerebral symptoms had been present, the brain was free from pigment even though the blood contained it. Further, severe nervous symptoms occur without our being able to demonstrate pigment in the blood or in other organs. Conversely, HERZ even found pigment in the tunics of the cerebral vessels, although he had not observed any symptoms of brain mischief during life.

If we now revert to the case above reported, we can see by it how well founded were the doubts of the authors just enumerated in regard to the part played by pigment in comatose fever. In that case we specially noticed that pigment deposit had occurred in the walls of those vessels wherein degeneration of the epithelial cells had already taken place in the form of swelling and granulation. Disturbances of brain function appeared at the moment when these swollen and partly pigmented cells entered the bloodstream and remained fixed in those capillaries whose tunics had in consequence of degeneration lost their contractility, and whose lumina had by the swelling of the endothelium been narrowed or altogether obliterated.

The cells obstructing the brain capillaries were most probably white blood corpuscles which had in part become pigmented and in part swollen. But as the brain symptoms, and consequently the thromboses which caused them, coincided with the access of fever, we may certainly conclude that the swelling both of the white blood-corpuscles and of the vascular endothelium occurred under the influence of malarial poison. We find, moreover, lymph corpuscles in the spleen, whose resemblance to the cells found in the brain thrombi is unmistakable. This leads us to assume an irruption of swollen, pigmented cells from the spleen into the blood during the fever paroxysm. The brain changes in comatose intermittent fever, which I have above described, offer to my mind a satisfactory explanation of the phenomena which are not intelligible on the theory of pigmentary embolism. Hence brain symptoms are by no means necessarily to be expected whenever pigment is present in the vascular tunics and perivascular spaces, a fact already established by many writers. On the other hand, even in the total absence of pigment alike from the brain and other organs, highly developed cerebral symptoms must occur as soon as the endothelium swells and the brain capillaries become obstructed by white blood-corpuscles.

The fact adduced by NIEMEYER, in opposition to the importance of pigmentary emboli, viz., that cerebral symptoms may completely disappear after the administration of quinine in massive doses, is now readily explicable on the assumption of obstruction of the capillaries by white blood corpuscles. It is not unlikely that quinine, when it gets into the blood, exerts such an action on the swollen vascular endothelium and white blood-corpuscles as partly to prevent and partly to remedy the collection of the latter in the capillaries, and the consequent obstruction.

I must now say a few words about the eschars acutely developed on both trochanters the day before death. Such forms of inflammation from pressure occurring in the most various parts of the body, and even gangrene of the extremities, in the course of pernicious intermittent fever, have already been described by many authors (e.g., FOURVIER, SCHOLZ, LAFAYE, HERZ, etc.). So also in this disease boils and carbuncles are formed whose origin Poor explains by pigmentary thromboses of the skin capillaries. The eschars in

our case are probably to be accounted for by irritation of the nerve centres, and I am disposed to class them with CHARCOT'S cases of *eschare à formation rapide* following on cerebral and spinal hæmorrhages

Finally, let me be permitted to make some remarks on the nature of the pigment which in all the cases under my observation imparted a dark slate coloured tinge to the most diverse organs

All authors from MECKEL to ARNSTEIN regard the pigment, which in cases of malarial cachexia accumulates in the blood and other tissues, as a product of disintegration of the red blood corpuscles which lose their vitality during the fever paroxysm According to the unanimous testimony of all writers, the form and size of the separate pigment particles are extremely variable Sometimes the particles are round, sometimes angular, their size varying from the merest point to 8 or 9 μ In all the cases investigated by me the pigment presented a special form, and certainly bore no resemblance to the colouring matter of the red blood-corpuscles such as we commonly find it, with all its modifications, in other pathological conditions and in melanotic tumours In particular, I never found very fine pigment granules, on the contrary, most of the granules were alike in size and in circular form, and contained a brilliant central portion, so that each presented a double contour The lumps and masses proved on closer investigation to consist of the above-described single, uniformly circular, corpuscles All this arouses serious doubt in my mind as to the derivation of the granular pigment of malaria from the colouring matter of the blood, and suggests the inquiry whether these forms do not arise elsewhere Indeed, if we compare them with COHN'S chromatogenous species of micrococcus, especially the species which he designates *Micrococcus prodigosus* or *Palmella prodigiosa*, we are involuntarily led to conjecture the existence of a certain connexion between malarial pigment and these low organisms I do not undertake to solve the question, but I consider it necessary to point out the propriety of raising it, in view of the above described uniformity in shape and size presented by the malarial pigment, in view, too, of the fact that the origin of the latter from the colouring matter of the blood is by no means firmly established At the same time I trust that inquiries may be directed to this point wherever the acquisition of the material thereto necessary, as regards quality and quantity, is not attended by insurmountable difficulties

INVESTIGATIONS REGARDING THE BACILLUS OF ENTERIC FEVER

By Professor C J EBERTH of Zurich

(Ibid, 1881, 1, 486)

IN a former paper (in the *Archiv* for 1880) I showed that in typhoid fever schizomycetes are found in the lymphatic structures of the abdomen (intestinal mucous membrane, mesenteric glands, spleen), which I believed might be regarded as specific typhoid fungi, as they differ in many respects from the organisms hitherto found in man. I was strengthened in this opinion by the fact that their number goes on diminishing as the duration of the disease is prolonged. That is to say, it has been proved that just in the beginning and at the height of the malady, but before sloughing has occurred, these organisms appear in the largest numbers, and that as the duration of the process extends they again disappear with the retreat of the characteristic "medullary infiltration."

Much as I should like to have brought forward further proofs of the specific character of these fungi by means of a greater number of fresh observations, I have hitherto failed to enjoy suitable opportunities. However, the 17 cases of typhoid which I now report cannot fail to prove a welcome addition to the already existent material. Moreover, I thought it right not to omit a search for indirect evidence, which, by demonstrating the absence, in the course of other diseases, of those organisms which have hitherto been found in typhoid, affords weighty arguments in favour of the specific nature of the organisms in question.

I now, in the first place, detail 11 cases of various partly infective processes

VARIOUS PATHOLOGICAL CONDITIONS

No 1—Female, aged 28. Postmortem $4\frac{1}{2}$ hours after death.

Larynx unaffected.

Thoracic organs—Fungoid endocarditis of the aortic valves

Lymphatic glands—Not enlarged. Among 80 sections one capillary was found obstructed by micrococci for a short distance, and one irregular heap of micrococci lying free.

Spleen much enlarged, and contained an old infarct. Among 30 sections, two small reticulated heaps of micrococci were discovered in the infarct.

Suppurative inflammation of knee. Many micrococci in the pus. Bedsore, the skin for a considerable distance around was gangrenous, and the underlying veins contained dark red thrombi.

No 2—Male, aged 5. Postmortem 14 hours after death.

Larynx unaffected.

Thoracic organs—Fungoid and ulcerative endocarditis of the tricuspid valve. Embolism of different branches of the pulmonary artery.

Lymphatic glands—Not enlarged. Among 80 sections no coccus- or bacillus-heaps.

Spleen—In each large section, measuring about 18 mm \times 5 or 6 mm, there were from 5 to 15 greyish brown piles of micrococci, some of them very large.

Kidneys—Enlarged, pale (scarlatinal nephritis).

Skull—Suppuration of petrous bone, fungoid phlebitis of the sinus, suppurative phlebitis of the jugular vein.

No 3—Female, aged 33. Postmortem 19 hours after death.

Larynx unaffected.

Thoracic organs—A tolerably recent, but already pale, infarct in one lung. Empyema.

Lymphatic glands—Not enlarged. In about 40 sections, no micrococcus- or bacillus-heaps.

Spleen —Enlarged No micrococcus or bacillus-heaps
 Ichorous endometritis from retained placenta, suppurative, fungoid peritonitis Many micrococci and putrefactive bacilli in the peritoneal exudation Septicæmia

No 4 —Male, aged 2 Postmortem 20 hours after death

Larynx unaffected

Thoracic organs —Extensive fat-embolism of the lungs Pulmonary œdema, anæmia

Lymphatic glands —Somewhat enlarged No organisms found in 50 sections

Spleen —Rather swollen No organisms found in 40 sections

Intestines —Peyer's and the solitary glands somewhat swollen

Extensive traumatic separation of the skin, which had occurred two days before, along with laceration of the soft parts of the left leg

No 5 —Female, aged 33 Postmortem 32 hours after death

Larynx unaffected

Thoracic organs —Pulmonary œdema

Lymphatic glands —Enlarged, chiefly those of the inguinal region The mesenteric glands were unaffected
 Those of the groin contained many heaps of micrococci Extensive inflammation of the leg caused by an ulcer on the foot Ichorous endometritis

No 6 —Male, aged 54 Postmortem 40 hours after death

Larynx unaffected

Thoracic organs —Focus of gangrene of the size of a walnut in the right lung Cancer of the stomach

Lymphatic glands —Not enlarged, infiltrated with cancer, containing no micrococci or bacilli

Spleen —Not enlarged.

Intestines unaffected.

Suppurative inflammation of the knee, many streptococci in the contents of the joint

Bedsore

No 7 —Female, aged 67 Postmortem 49 hours after death

Larynx unaffected

Thoracic organs —Empyema, bronchitis, œdema, pericarditis

Lymphatic glands —Enlarged, hard, containing no organisms

Spleen —Somewhat enlarged, containing no organisms

Intestines unaffected

No 8 —An infant of a few weeks Postmortem 53 hours after death

Larynx and *thoracic organs* free from important change

Lymphatic glands —Somewhat enlarged, slight diffuse infiltration, contained no organisms

Spleen —Not enlarged, free from organisms

Intestinal catarrh

Cholera infantum and atrophy

No 9 —Male, aged 44 Postmortem 56 hours after death

Larynx unaffected

Thoracic organs —Chronic endocarditis of the mitral valve, recent deposits on all the valves

Liver cirrhotic

Lymphatic glands —Somewhat enlarged, indurated, contained no organisms

Spleen enlarged, contained no organisms

Intestines unaffected

This was a case of cured syphilis

No 10 —Male, aged 25 Postmortem 68 hours after death

Larynx unaffected

Thoracic organs —Hydrothorax, adherent pericardium, hypertrophy and dilatation of the heart, thickening of the mitral valve, soft catarrhal hepatitis

Lymphatic glands —Normal, no organisms

Spleen —Slightly enlarged, no organisms

No 11 —Male, aged 28 (?), found dead Postmortem 100 hours after death

Advanced decomposition

Lymphatic glands —Small, and were therefore not examined.

Spleen —Of normal size, containing only scanty, completely isolated putrefactive bacilli

An epileptic who was found dead

Of these cases some deserve particular attention

In the first case (fungoid endocarditis), among 80 large sections taken from the unswollen mesenteric glands, a capillary vessel was only once found obstructed for a short distance by micrococci, close by a reticulated small micrococcus-heap

In the second case (caries of the petrous bone, extensive fungoid phlebitis of the dura), the lymphatic glands proved free from cocci, either separate or gathered into heaps The spleen, however, contained large and numerous masses of micrococci

The third case (septicæmia from retained placenta), although yielding in the blood and various organs solitary bacilli staining with methyl-violet, showed no bacillus-heaps, either in the lymphatic glands or spleen, similar to those found in typhoid

In the corpse of the epileptic brought in from outside, and already much decomposed (about 5 days dead), although putrefactive bacilli were found singly in every section from the spleen, organisms similar to those of typhoid were never found

CASES OF TUBERCULOSIS AND PHTHISIS

The rare occurrence of typhoid bacilli in somewhat advanced ulceration of the intestinal mucous membrane has proved that, although perhaps in many instances (*eg*, relapse of typhoid) this alteration of the membrane is favourable to the entrance of organisms into the wall of the gut, yet it does not come into consideration in recent cases But it seemed to me to be indispensable to the completeness of the investigation into the occurrence, in the course of other diseases, of the organisms found in typhoid, to examine minutely the spleen, mesenteric glands and intestines, with reference to the presence of organisms, especially in cases of tuberculosis and phthisis wherein lung and intestine were highly disorganised

No 1 —Male, aged 22 Postmortem 8 hours after death

Larynx —Ulceration of right vocal cord

Thoracic organs —Lobular foci of caseation, caverns, tubercle

Abdominal organs —Amyloid liver

Lymphatic glands —Amyloid degeneration

Spleen enlarged, "sago spleen"

Intestines —Amyloid degeneration of the mucous membrane, in the colon a few number of tubercular ulcers arranged in rows

No 2 —Male, aged 28 Postmortem 10 hours after death

Larynx unaffected

Thoracic organs —Dilatation of the heart, globular vegetations Disseminated grey induration, with cheesy deposits and caverns

Abdominal organs —Nutmeg liver, milinary tubercles of liver

Lymphatic glands —Caseous foci in bronchial glands Mesenteric glands enlarged, caseous and calcified Lumbar glands enlarged to the size of a hen's egg, caseous

Spleen enlarged

Omentum thickened, studded with many grey and ancient tubercles Cheesy inflammation of the lumbar vertebrae Psoas abscess

No 3—Male, aged 30 Postmortem 10 hours after death

Larynx —Ulcers the size of lentils on right vocal cord

Thoracic organs —Cheesy alveolitis, slaty induration Caverns

Lymphatic glands —Swollen, partly indurated, and necrosed here and there

Spleen enlarged

Intestines —Many lentil sized ulcers in the ileum, besides large clean ulcers with slaty bottom The same condition existed in the colon The ulcers occupied about one-third of the whole extent of mucous membrane

No 4—Male, aged 24 Postmortem 3 hours after death.

Larynx unaffected

Thoracic organs —Cheesy lobular pneumonia

Lymphatic glands —Not enlarged, contained no foci of necrosis

Spleen somewhat enlarged

Intestines —Caseation of follicles Small clean ulcers

No 5—Male, aged 30 Postmortem 12 hours after death

Larynx —A small ulcer on the left vocal cord

Thoracic organs —Apical induration of the lungs, with cheesy deposits

Lymphatic glands —Both mesenteric and inguinal glands were enlarged and caseous

Spleen somewhat enlarged

Intestines —Ulcers mostly in process of healing

No 6—Female, aged 33 Postmortem 23 hours after death

Larynx unaffected

Thoracic organs —Caverns in apices Caseous lobular hepatisation Superficial (catarrhal?) ulcers of the larger bronchi

Lymphatic glands —Somewhat swollen, cheesy

Spleen slightly enlarged

Intestines —Throughout small intestine, deep excavated ulcers

Bedsore over sacrum

No 7—Male, aged 36 Postmortem 24 hours after death

Larynx —Many small ulcers on epiglottis

Thoracic organs —Apical caverns Indurations with cheesy deposits

Lymphatic glands —Slightly enlarged, necrosed in places

Spleen enlarged

Intestines —Tubercular ulcers of various sizes in the small intestine and colon Tubercular eruption on corresponding portions of serous covering

No 8—Male, aged 55 Postmortem 25 hours after death

Larynx unaffected

Thoracic organs —Extensive slaty induration with caseous foci

Lymphatic glands —Much enlarged, caseous and indurated

Spleen moderately enlarged

Intestines unaffected

No 9—Male, aged 48 Postmortem 27 hours after death

Larynx unaffected

Thoracic organs —Recent greyish-red, and old cheesy lobular pneumonia

Lymphatic glands —Slightly enlarged, fatty and necrosed

Spleen slightly enlarged

Intestines —Many ulcers

No 10—Female, aged 21 Postmortem 28 hours after death

Larynx unaffected

Thoracic organs —Lobular hepatisation Miliary tubercles

Abdominal organs —Miliary tubercles in liver
Lymphatic glands not enlarged
Spleen —Enlarged, infiltrated with miliary tubercles
Intestines —Two small ulcers in the small intestine

No 11 —Female, aged 30 Postmortem 31 hours after death
Larynx unaffected
Thoracic organs —Caseous foci and caverns in the lungs
Lymphatic glands —Totally necrosed
Spleen slightly enlarged
Intestines —Widespread tubercular ulceration

No 12 —Female, aged 33 Postmortem 69 hours after death
Larynx unaffected
Thoracic organs —Cheesy lobular pneumonia
Lymphatic glands —Much enlarged, extensively caseated and necrosed
Spleen normal in size
Intestines —Many ulcers, some very large

No 13 —Male, aged 55 Postmortem 25 hours after death
Larynx unaffected
Thoracic organs —Slaty induration, with cheesy foci and caverns
Lymphatic glands —Much enlarged, indurated and cheesy
Spleen slightly enlarged
Intestines unaffected
 Catarrh of stomach

Examination of the organs wherein, in recent cases of typhoid, bacilli and micrococci were most frequently found, yielded a result absolutely negative as regards these organisms in the above-noted 13 cases of tubercular and non-tubercular consumption, although in some of them the intestinal mucous membrane exhibited advanced ulcerative destruction. It may be objected that the number of cases is too small to be of value. I think, however, that the smallness of the number ought not to enter into consideration, in view of the very extensive intestinal ulceration sometimes present. Although *à priori* we should expect that ulcers of the mucous membrane would favour penetration of the intestinal walls by organisms, and settlement of these latter in the lymphatic glands and spleen, we fail to find any germs. This is likewise the case during the ulcerative period of typhoid. It thus appears that even when loss of substance has actually occurred, altogether special conditions are necessary in order that an invasion of germs should take place from the intestinal tract.

One might expect that the serious disintegration to which the intestinal mucous membrane is subjected by medullary infiltration would be a favouring circumstance. The occurrence of bacilli in all typhoid cases wherein medullary swelling was most developed might support this view. In that case a greater number of organisms should invariably be found in the parts so infiltrated. But precisely the contrary is the fact, for I found them there far seldomer than in the lymphatic glands. If medullary tumefaction favoured in a general manner the irruption into diseased parts, of organisms existing any way you like in the intestine, one would surely find them also in the course of other processes producing similar alterations. In leucæmia, however, as well as in a case of tuberculosis with marked medullary infiltration of the follicles, I have failed, whenever the autopsy was not too long delayed, to find organisms in either the mucous membrane or lymphatic glands. Accordingly, it seems that only under special circumstances do diseases of the intestinal mucous membrane favour the migration of schizomycetes in general from the intestinal contents.

CASES OF TYPHOID IN WHICH BACILLI WERE FOUND

No 1—Male, aged 60 Duration of disease 11 days Postmortem 16 hours after death

Larynx —Mucous membrane somewhat injected, ulcers beginning to be formed.

Thoracic organs —Bronchitis, croupous pneumonia

Lymphatic glands —Moderately enlarged, extremely hyperæmic Medullary infiltration not thoroughly diffused, lymph sinus and follicular cords not to be distinguished from one another No necrosis In each section 10–20 bacilli-heaps, some very large

Spleen enlarged to more than double its normal bulk, diffuent, containing likewise large bacilli heaps in almost every section.

Intestines —Marked medullary tumefaction of Peyer's and the solitary glands, no sign of sloughing

No bedsores

No 2—Male, aged 23 Duration of disease 18 days Postmortem 24 hours after death

Larynx —Necrosis of the true vocal cords, tracheal croup, œdema of glottis, tracheotomy

Thoracic organs —Sero purulent effusion into pleuræ, bronchitis, lobular hepatisation here and there in course of resolution

Lymphatic glands —Enlarged, moderately swollen, containing many large bacilli-heaps (2 or 3 in each section)

Spleen —Enlarged, also containing a considerable number of bacilli-heaps, although not so abundantly as the lymphatic glands

Intestines —Slight medullary tumefaction of Peyer's glands and solitary follicles in the ileum Immediately above the valve were some small sloughs on Peyerian patches exhibiting slight medullary infiltration. Colon unaffected

No 3—Male, aged 22 Duration of disease 24 days Postmortem 46 hours after death

Larynx —A few small ulcers

Thoracic organs —Greyish-red hepatisation on the right side, pulmonary œdema

Lymphatic glands —Slightly enlarged, occasional medullary infiltration, no necrosis Among 50 large sections 5 bacilli-heaps, some of them moderately large, were found, mostly in the cortex The single bacilli were of the same size and shape as those already found in typhoid, but their contours were more delicately marked

Spleen —Enlarged, in 30 large sections 5 moderately big bacilli-heaps Here also the bacilli were wanting in the sharp limitation observed at other times The heaps themselves at first sight resembled rather masses of a finely granular substance, which with difficulty admitted of differentiation into single bacilli

Intestines —Medullary infiltration, with sloughing and ulceration

No 4—Female, aged 17 Duration of disease 28 days Postmortem 46 hours after death

Larynx unaffected

Thoracic organs —Compression and congestion of the lungs

Lymphatic glands —Slightly swollen, no necrosis Among 30 sections 2 moderately large bacilli-heaps were discovered

Spleen —Enlarged No bacilli-heaps

Intestines —A few bean-sized and lentil-sized ulcers with clean surface and level edges

Perforation Peritonitis

No 5—Male, aged 30 Duration of disease 36 days Postmortem 8 hours after death

Larynx —A small superficial ulcer on the left true vocal cord

Thoracic organs —Fibrinous pleuritis, lobular hepatisation

Lymphatic glands —Enlarged and injected. Tumefaction only in places still diffused The lymph paths and follicular cords already easily distinguishable No necrosis Among 30 sections, each about 18 × 6 or 8 mm, 1 small bacilli-heap was found.

Spleen —Enlarged Contained no bacilli.

Intestines —Ulceration of Peyer's patches, the edges still showing medullary tumefaction Some healing ulcers

No 6—Male, aged 34. Duration of disease about 43 days Postmortem 36 hours after death

Larynx unaffected

Thoracic organs —Pulmonary œdema.

Lymphatic glands —Moderately swollen, diffuse infiltration Among 50 sections 2 large bacilli-heaps

Spleen —Swollen Among 40 sections no bacilli-heaps
Intestines —Swelling everywhere disappeared Only in cæcum one lentil-sized clean ulcer
Chronic arachnitis Excessive development of fat

CASES OF TYPHOID IN WHICH BACILLI WERE NOT FOUND

No 1 —Male, aged 23 Duration of disease 14 days (?) Postmortem 22 hours after death
Larynx unaffected

Thoracic organs —Serous effusion into pleuræ Bronchitis Pulpy pneumonia Anæmia
Lymphatic glands —Of nearly normal size

Spleen —Enlarged to double its normal size

Intestines —Swelling of the solitary follicles Deeply pigmented ulcers

No 2 —Male, aged 22 Duration of disease 14 days Postmortem 16 hours after death

Larynx —A small ulcer on each side

Thoracic organs —Pulpy pneumonia with lobular suppuration

Lymphatic glands —Enlarged, caseated, hyaline degeneration of the stroma, destruction of the tissue

Spleen enlarged

Intestines —Marked sloughing, clean ulcers, intestinal hæmorrhage

No 3 —Male, aged 24. Duration of disease 14 days Postmortem 2 hours after death

Larynx unaffected

Lymphatic glands —Slightly enlarged, and here and there softened No bacilli.

Spleen —Enlarged No bacilli

Intestines —Slight tumefaction of Peyer's patches, recent ulceration, very extensive in places Some ulcers still covered by sloughs Perforation

Peritonitis

No 4 —Female, aged 24. Duration of disease 16 days Postmortem 32 hours after death

Larynx unaffected

Lymphatic glands —Enlarged, and much indurated in parts No bacilli

Spleen —Enlarged No bacilli

Intestines —Slight tumefaction of some of Peyer's patches Ulcers in part still covered by sloughs, and in part clean

No 5 —Male, aged 25 Duration of disease 17 days Postmortem 9 hours after death.

Larynx unaffected

Thoracic organs —Pleuritis on right side Pneumonia Growths on the mitral valve

Lymphatic glands —Moderately swollen, containing no large cells

Spleen much enlarged

Intestines —Ulcers in parts clean, elsewhere covered by sloughs

Focus of mycosis in lung, consisting of micrococci only

No 6 —Male, aged 20 Duration of disease 21 days Postmortem 12 hours after death

Larynx unaffected

Thoracic organs —Pleuritic effusion, greyish-red lobular hepatisation.

Kidneys —An abscess the size of the head of a pin

Lymphatic glands —Moderate tumefaction, extensive necrosis and caseation

Spleen enlarged

Intestines —A high degree of tumefaction of Peyer's glands and solitary follicles Superficial sloughing, no ulcers

No 7 —Male, aged 35 Duration of disease 26 days Postmortem 13 hours after death

Larynx —Ulcers on the vocal cords

Thoracic organs —Pneumonia.

Lymphatic glands —Slightly swollen Diffused medullary infiltration Necrotic focus No bacilli.

Spleen —Enlarged. Among 25 sections, 2 small colonies of micrococci were found
Intestines —No glandular tumefaction Clean ulcers Perforation as large as a lentil
 Peritonitis

No 8 —Female, aged 42 Duration of disease 27 days Postmortem 45 hours after death

Larynx unaffected

Thoracic organs —Pulmonary oedema

Lymphatic glands —Small, no necrosis, no tumefaction

Spleen somewhat enlarged.

Intestines —Clean ulcers Two lentil-sized perforations

Peritonitis

No 9 —Male, aged 32 Duration of disease 30 days Postmortem 20 hours after death

Larynx unaffected

Thoracic organs —Lobular hepatitis

Lymphatic glands —Swollen No bacilli.

Spleen —Enlarged. No bacilli.

Intestines —Slight tumefaction of solitary follicles Commencing ulceration

No 10 —Male, aged 17 Duration of disease 33 days Postmortem 18 hours after death

Larynx —Deep ulcers at anterior insertion of vocal cords

Thoracic organs —Suppuration in mediastinum, extending from tracheotomy wound

Lymphatic glands —Somewhat enlarged. No diffused infiltration. The follicular cords and lymph paths distinct No foci of bacilli

Spleen —Enlarged, soft Among 20 large sections, 2 micrococci-piles of moderate size, presumably originating by migration from the mediastinum. No bacilli.

Intestines —Peyer's patches completely degenerated Solitary follicles still a little tumefied

Small bed sore

No 11 —Male, aged 26 Duration of disease 41 days Postmortem 49 hours after death

Larynx unaffected

Thoracic organs —Empyema

Lymphatic glands —Almost completely degenerated, containing no foci of necrosis Among 50 sections, no bacilli-heaps were found

Spleen —Somewhat swollen, containing no bacilli-heaps

Intestines —Healing, slate coloured ulcers

The changes in the mesenteric glands and intestines were more recent in the cases where bacilli were found than in the negative cases, and although tumefaction was not very highly marked, still that partial necrosis of glands failed to be discovered which in the negative cases and in the later stages of typhoid was so frequently encountered Case 6 is worthy of note, as in it bacilli were found after an illness reported to have lasted 43 days

In all cases except the first the number of bacilli was much smaller than was reported in my former observations, which is quite in accordance with the fact already stated, that with increased duration of the typhoid process the number of bacilli present in the organs diminishes* This diminution appears due not only to increased elimination, but to actual destruction of the organisms Thus sometimes (and more particularly in Case 2, wherein the duration of the disease was 18 days) I found great heaps of true typhoid bacilli in the lymphatic glands, alongside of groups whose constituent individuals had altogether lost their delicate but distinct contours, and were in consequence hardly visible Even if here and there on the surface of these colonies a withered bacillus was distinguishable, all the remainder of the heap presented the appearance of a finely granular mass of detritus In Case 1 (duration of disease 11 days)

* In the cases now reported as yielding bacilli the average duration of disease was 26 days, as against 17 days, the average noted in the group of similar cases related in my former paper

the bacilli were so numerous that in every complete section of a lymphatic gland not quite so large as a cherry I found from 10 to 20 piles no bigger than ganglionic cells, besides many small colonies

Hardly differing in size or shape from common putrefactive bacilli, the organisms found could be distinguished from these latter only by their slight power of being stained by hæmatoxylin, Bismarck brown and methyl-violet. While putrefactive bacilli, whether in sections of alcohol preparations or in the dry state, stain deeply in the reagents just named, typhoid bacilli absorb little colouring matter, however long they may be left in the staining fluid. Larger bacilli-colonies appear indeed to be stained brown or blue. But when teased under a lens, whereby it is easy to isolate a large number of bacilli, these are seen to be hardly stained, or at most they exhibit a pale yellow tint not even remotely comparable with the deep brown or dark blue which putrefactive bacilli present after treatment with the above-mentioned staining agents. The intermediate substance reacts towards colouring fluids in the same way as the bacilli themselves. It is of course present in small quantity, and all the more difficult to demonstrate under the microscope, in consequence of the ease with which single bacilli are isolated by treatment of the colonies with acetic acid. Without using this it might perhaps be possible by teasing to divide a heap into smaller collections, but not to set free any considerable number of single bacilli. By employing it, however, a slight touch with a needle often suffices to separate a whole colony into its constituents.

On the other hand, when typhoid bacilli are dried on the slide they are deeply stained by methyl-violet, always supposing that treatment with alcohol has been omitted. If a little juice be removed with all possible precautions from the fresh surface of section of a medullary-infiltrated lymphatic gland during the initial stage of typhoid, and be allowed to dry in a thin layer on the slide, and if a section of a similar gland hardened in alcohol be taken, and if both be carefully treated with methyl-violet, the cells of the former will perhaps be found unequally stained, some slightly, others more deeply, but on the whole they will be stained much more deeply than the cells of the section, among which a large number will always remain uncoloured. Moreover, in the former preparation one is astonished by the great multitude of deep-blue tinged isolated bacilli lying in small groups or singly among the lymph cells. It is only under such circumstances that one obtains an accurate idea of the prodigious number of these organisms present. I have never succeeded in observing single bacilli in prepared sections of the same gland, however easily the bright blue stained colonies might be seen. I am fully convinced that examination of dried and coloured juice from the lymphatic glands and spleen will yield much more precise results in regard to typhoid bacilli than can be expected from the investigation of sections. That hitherto I have not always employed this method I can explain by the fact that the demonstration of large bacilli-masses in the lymphatic organs of typhoid patients seemed to me more important than the demonstration of isolated bacilli. I would, however, add here, in order from the very first to set aside any doubts as to the precision of the method, that I was unable to find any organisms, whether bacilli or micrococci, in dried and stained juices from the lymphatic glands of those who had died of non-infectious diseases, provided only that the specimens were taken from fresh corpses.

In Case 1, wherein after a disease period of 11 days the size and number of the bacilli-colonies were truly extraordinary, the dried preparation contained, besides single bacilli, a very large number of double ones. Among these latter were some whose single members were only a little longer than they were broad, so that they rather resembled diplococci formed from slightly oval cocci. In no other case were these double bacilli so plentifully found.

In many bacilli one to three dimly-shining, round, spore-like corpuscles were visible, lying indifferently either towards the middle or near the ends of the rods. With the exception of these spore-like corpuscles in the interior of bacilli, I have hitherto failed to find micrococci masses in any uncomplicated case of typhoid. Only quite superficially in ulcers and sloughs have I found micrococci. This has also been put on record by KLEBS. They are found there in the company of bacilli which, exactly like the globular cocci, stain deeply in methyl-violet and Bismarck brown, and presumably are putrefactive fungi which have

wandered hither from the intestine That they have nothing to do with the typhoid bacilli is evidenced by their appearance at a later period of the process, at a time when there is a marked diminution in the number of bacilli accumulated in the lymphatic glands

Comparison with the typhoid bacilli described by KLEBS (*Archiv fur exper Pathologie*, bd xii, 1880), which through a colleague's kindness I had an opportunity of studying on a medullary-infiltrated Peyer's patch from one of the Prague cases, leaves no doubt as to the identity of the organisms present in the Prague and Zurich patients In this specimen, which had been taken from a severe case of typhoid, there were present not only the bacilli found here, but also longer and somewhat broader filaments which I had not before encountered As up to the present no details have been published with respect to the frequency with which both organisms occur, and as no breeding experiments are on record, it is not yet certain whether we have to deal with two different forms of schizomycetes or only with two developmental stages of one and the same organism

This problem can doubtless be solved by investigations of the material furnished by different epidemics It will then be ascertained which forms are the most constant, whether perhaps some other organisms enter into the struggle, or whether one sole parasite originates the typhoid process With reference to this I have already for a long time directed my attention to the diseases arising from meat consumption, wherein even the identity of the anatomical changes with those of common ileo typhus has been called in question Wrongly so, in my opinion, because both the symptoms during life and the postmortem signs correspond with those of enteric fever The diagnosis of typhoid in the cases of meat-poisoning which occurred last year (1880) in Zurich was neither exclusively clinical nor exclusively anatomical I can, however, very well imagine that in the instances just referred to a poison was in operation different from that of common enteric fever But as yet nobody possesses any accurate knowledge in regard to it Were the existence of such an organised poison demonstrated, in my opinion it would prove that by germs different from those which originate common enteric fever changes can be produced similar to those of typhoid

Unfortunately, I am not in a position to give any information about the microscopic appearance of the organs in the cases of disease from meat consumption which occurred during the Kloten epidemic Postmortem examination could be undertaken only at a comparatively late period, so that from a fear of getting complicated results I abandoned the idea of searching for bacteria

Stress must be laid on the small number of bacilli discovered in the medullary infiltration of the intestine in the Zurich typhoid cases as very remarkable when compared with the great number present in some of the Prague cases This may, I think, be explained by the longer duration of the process in my patients, as contrasted with some cases observed by KLEBS, which ran a very acute course It is also conceivable that in the latter the infection was more virulent than in the former If at first the bacilli are localised in the intestinal mucous membrane, the lymphatic glands will remain unaffected in the initial stage, and, on the other hand, supposing that there be no fresh infection, in proportion to the distance whereto the bacilli spread from the mucous membrane their numbers in it will diminish while they are making their appearance in increased quantity in the blood-vessels and lymphatics of the intestine, and in the lymphatic glands

PATHOGENIC BACTERIA IN DRINKING WATER DURING TYPHOID
EPIDEMICS

By J BRAUTLECHT

(Ibid., 1881, II, 80)

In specimens of drinking water which in the opinion of experts was to be regarded as the cause of partial epidemics of typhoid (*eg*, at the Brunswick gymnasium in 1877, at Dolme on the Weser in 1879, etc), I have repeatedly found a specific pathogenic bacterium belonging to the species *Bacillus*

When such a water, containing bacilli, delicate filaments, and cocci and cocci-heaps related to them, is left standing for 48 hours, at a temperature of 37° to 40° C, in glasses plugged with cotton, an iridescent scum forms on the surface consisting of an accumulation of similar organisms often mingled with calcium carbonate. This can be easily removed, and transferred to a suitable fluid for further cultivation. I use for this purpose a 3 per mil solution of gelatine in well-water, to which, after boiling, 0.25 of ammonium phosphate has been added. This is kept at a temperature of 35° to 40° C. If the water does not at the same time contain too large a number of other bacteria, and if only those flakes are selected for further culture which generally present themselves in the first crop, then very soon, and often in the next crop, unmixed growths of the bacilli in question are found, which on the first transfer, as is already known, grow in general slowly in the form of white flakes at the bottom of the fluid. Succeeding crops, at the expiration of 48 hours, commonly form abundant masses on the surface, consisting of whitish and, later on, yellowish-white mouldiness. Examined under the microscope, the flakes of the first crop consist of a tangle of delicate filaments here and there more or less distinctly segmented, and soon falling apart into short bacilli, which then break up into cocci loosely hanging together like a string of pearls. In this condition they either form large heaps or still further divide, coming under observation as single cocci or in small groups. In subsequent cultivations the longer filaments soon completely disappear, and short bacilli are alone visible, of various lengths, and undergoing transformation into cocci as just described. It is clear that bacilli again form from these cocci, but I have hitherto been unable to observe with complete accuracy the mode in which this is effected. I would, however, deny a process of budding from one side of the spore (as which each coccus should probably be regarded), the capitellum remaining meanwhile attached in a manner similar to that observed in the formation of other bacteria. I am of opinion that the bacillus is formed within the spore. This swells and becomes oval, and the bacillus emerging increases in length in both directions. Spontaneous movement is absent from all stages of growth. I would not, however, positively deny that, under certain conditions, which I have not yet minutely investigated, this motion may occasionally occur at the period of the evolution of the bacilli from the cocci.

Accurate measurement of the diameter of the filaments and bacilli, though very desirable as affording means of distinguishing them from some otherwise similar pathogenic species, has hitherto proved impossible. They are about as big again as the bacilli of septicæmia delineated by Koch, and about once and a half as big as the pathogenic bacilli from the urine of typhus patients, which I have repeatedly demonstrated, and which appear to be constantly present in that condition. They are nearly half as big as *bacterium termo*, while *bacillus subtilis* is at least three times as big.

A very remarkable distinction between them and many other chiefly innocent kinds is furnished by their conduct in the cultivating fluid. These bacilli, like some other pathogenic varieties, fail to exhibit that strong reducing power which is characteristic of many bacteria—for instance, *bacterium termo*—and several bacilli, such as *bacillus subtilis* and others, which are not rarely found in well-waters subject to

influx from open surface-drains, and to which, as well as to their cultivation products, no pathogenic properties are assigned. The innocent varieties readily reduce the nitrates in water or in cultivating fluids to nitrites, while the others, even after prolonged contact, are totally unable to do so. This can easily be demonstrated by the well-known and delicate reaction with iodide of potassium, starch paste and sulphuric acid.

Moreover, in unmixed cultivations that disgusting stench is absent which accompanies even small quantities of *bacterium termo*. Though development may be vigorous, the smell is not unpleasant. It is similar to that of boiled milk.

When the crop is unmixed, the reaction to litmus paper is neutral, neither alkaline, as is the case with *bacterium termo*, nor acid, as with others. The distillate is, however, strongly alkaline, forming a cloud in the presence of hydrochloric acid, and a distinct deposit with NESSLER's test. Provided that only small quantities are employed, and that distillation is conducted quickly, the first portions of the distillate contain a fever-producing substance which by prolonged boiling, or after a few days' exposure, loses its activity.

A non-volatile body is moreover formed in the gelatine, which quickly decolourises free iodine, but which does not make its appearance during the decomposition arising from spontaneous invasion of bacteria.

The sensitiveness of the bacilli to acids is very marked. In a gelatine solution which barely reddens litmus paper no development takes place, while an alkaline condition also disturbs the growth, though not in such a decided way.

The formation of bacilli in well-water containing sufficient nutritive material is at ordinary temperatures a very slow process, and hardly discernible by the eye. However, from apparently perfectly transparent water, and without using the sediment, I have, after nine months, succeeded in cultivating bacilli such as I have described, with all their special properties, including their pathogenic powers. Later on, after about twice that interval, the capacity for cultivation seemed to disappear. Scum removed from the water, and that kept in contact with the water, behaved in a similar way, while mouldy masses which I had left to dry on glass retained, after the expiration of three years, their power of development, and were still pathogenic.

These bacilli, with all their characters as enumerated above, and their pathogenic action which has yet to be described, can be demonstrated not only in such suspicious waters, but also very easily and in great quantity in the urine of typhoid patients. During the height of the fever, cocci are for the most part found in it, but bacilli and filaments are also sufficiently plentiful. A faint urinary smell which persists in the early cultures, and a very slight alkaline reaction, depend probably on the presence of small quantities of *micrococcus ureæ*, and disappear later on.

Green algæ putrefied by midsummer heat, having recently been gathered in a place perfectly free from infection and subsequently kept in a place where the same condition prevailed, proved a further source of these bacilli. This seems to me to afford proof of their spontaneous origin, that is to say, of their transformation from other kinds. They were here found in the shape of a yellowish-white mouldy layer, as thick as the back of a knife, on the surface of the pulsatious heaps of weed which had fallen into tank decomposition. Cultivation, and experiments on animals, proved their identity with the form just described. When, without cultivation, they were injected into a rabbit they produced a degree of necrosis of the intestinal glands so severe that neither before nor afterwards did I ever reach it by the use of cultivated bacilli derived from no matter which of the three sources indicated. Unfortunately, I have hitherto failed to obtain suitable material for the decision of the conjecture, which, however, is probably true, that the bacilli lose their vigour by cultivation.

Before detailing my infection experiments I wish to mention a fact which must be borne in mind in order to secure success. Occasionally, sometimes sooner and sometimes later, a bacillus makes its appearance in the cultures, whether these are derived from the water, from urine, or from decomposing algæ masses, which is as broad again, or thereabouts, as the bacillus under consideration, but which agrees with it in morphological development and in its conduct towards the culture fluid. It does

not, however, possess any pathogenic property, or at least not a strongly marked one. Although I am unable to adduce satisfactory proof of my opinion, I am disposed to regard these larger bacilli not as an accidental complication, but rather as a particular vegetative form, which as soon as it presents itself in large quantity, renders the cultivation unfit for infection experiments.

If a subcutaneous injection of $\frac{3}{4}$ to $1\frac{1}{2}$ cubic centimetres of a bacillus culture which is just beginning to form a plentiful scum be administered to rabbits, a rise of temperature of from $0^{\circ}5'$ to $1^{\circ}5'$ C occurs about three quarters of an hour later. This persists for from 18 to 36 hours, when there is a return to the normal, or a fall to $0^{\circ}3'$ below it. Notwithstanding an ample supply of food, which is consumed in sufficient quantity, the rarity of diarrhoea, and a fever-free condition, the animals lose weight progressively, and die slowly, wasted to skeletons, sometimes after two, but more generally after from four to eight weeks. The course of events is different in very young animals (four to six weeks old). In them profuse diarrhoea sets in after two or three days, bringing on a fatal termination in a couple of days more. Here, postmortem examination reveals only intense hyperæmia of the whole digestive tract, with numerous ecchymoses, and small dark-bordered erosions of the stomach and intestines. In older animals an intensely catarrhal condition of the small intestine is constantly found, along with a generally well-marked enlargement in length and breadth of the darkened spleen, which as regards its thickness is less affected. There is invariably notable swelling and discolouration of the mesenteric glands, especially of the mass which lies between the extremities of the small intestine and cæcum. This is enlarged to more than four times its natural size. The small intestine is more or less vividly injected, in most instances it is cloudy along its entire length, this cloudiness being only scattered in less serious cases, its appearance is milky and in places pale red. Food is found only in portions corresponding to unclouded patches, if such are present, with a more naturally shining surface. The intestinal walls are thickened and easily torn, the mucous membrane markedly swollen, coloured red here and there, not rarely exhibiting irregular protuberances elevated above the level of the remainder. Corresponding to the cloudy portions of the intestine, Peyer's patches are, in the most various stages of the tumefaction, yellow, reticulated and infiltrated with medullary matter. Sloughing is, however, rare, and when it occurs it is, with few exceptions, limited to a few glands of a patch in which brownish-green or dark blue puncta of the size of a pin's head, or even smaller, are disseminated. Among 69 cases which I observed during one period of experiments lasting three and a half years, I only once observed an instance of generalised glandular destruction. As a general rule, the long gland at the end of the cæcum is affected in the same way as the glands of the small intestine. In other respects the cæcum, resembling in this the large intestine, but very rarely shows evidence of having been drawn into a share in the disease process. In both, however, the occurrence of trivial ecchymoses is left out of consideration. The heart is almost always pale and of a withered appearance, the lungs are only rarely hepatised or hypostatically congested. Oedema of the pale but otherwise intact lung is the rule. Gangrenous inflammation does not occur at the point punctured for the injection, nor do abscesses form, or if they do, they are very exceptional and of small size. In convalescing animals, however, abscesses which spontaneously burst do occur in the neighbourhood of the sexual organs or about the lower half of the head.

Nearly identical results were obtained after injection of the mouldy masses produced by cultivation, which were as far as possible freed from attached fluid.

Infection by the stomach is extremely uncertain, but I have succeeded in a few perfectly conclusive instances. In these initial diarrhoea occurred, but in other respects they manifested nearly the same symptoms and followed the same course.

By continued culture in the way above indicated, the pathogenic power of the bacilli is materially diminished. After a few cultivations, young animals no longer present that violent and rapidly fatal diarrhoea, they die later, and all their symptoms resemble those above described in the case of adult animals. The latter, although it is true they become ill, recover frequently after four weeks of sickness, especially if they are very strong. In this case they are, so far as my experience goes, proof against further

infection, so that injections which would be fatal to other animals produce in them merely a disorder passing away in a few days

Without entering on a minute discussion of the tolerably obvious theoretical and practical inferences derivable from the observations here in the briefest manner detailed, I may be permitted to make the following remarks. If it be conceded that the widespread epidemics which I have mentioned at the beginning of my paper, and to which in the course of time other instances less remarkable have been added, were really produced by the implicated waters, the connexion between typhoid diseases and the bacilli found in water is very close. I will, particularly with regard to the Brunswick gymnasium case, endeavour on a suitable occasion to demonstrate this with a degree of probability bordering on certainty. Even sceptics will be unable to deny the fact that although well-waters are frequently found containing perfectly harmless bacteria, there are also some containing pathogenic bacteria, which, when injected into rabbits, produce symptoms similar to those of typhoid, and are easily distinguished from many others by their behaviour in cultivating fluid. It is possible that the bacterium is only a variety which is all the more stable the longer it develops itself under the influences which produced it, and all the more variable the sooner its vegetative conditions alter and the more diverse those conditions are.

Lately, KLEBS and EBERTH have demonstrated bacilli in the intestinal and mesenteric glands in typhoid cases. It may perhaps prove possible to cultivate them also and to compare them with those described by me.

CONTRIBUTION TO THE ETIOLOGY OF LEPROSY

By Dr ALBERT NEISSER, Privatdocent at the University of Leipzig

(Ibid, 1881, II, 514.)

* * * * *

I—ON THE PRESENCE OF BACILLI IN THE ORGANS

ALL the pathological products encountered in the course of leprosy indicate with certainty, so far as the cases which I have investigated go, the presence of a single, well-defined and presumably specific bacillus-form peculiar to the disease. This organism is found in the neoplasms of the skin and of the mucous membranes of the mouth, palate and larynx, in the interstitial tissues of peripheral nerves, of the cornea, of cartilage and of the testicle, and moreover in lymphatic glands, the spleen and the liver.

According to our present knowledge, lepra bacilli are not to be found in the spinal cord or in the muscles, and they have no share in producing either bullous eruptions of the skin or joint affections, symptoms none of which can be regarded as primary, but which must, on the contrary, be classed as secondary changes, probably of a trophic nature depending on nerve lesions.

A.—In the *skin*, bacilli are found alike in the circumscribed tubercles and in the diffused infiltration which, for example, invades the whole face in a more or less uniform manner. The material for investigation was obtained in part from dead subjects and partly by excision from patients. It was then hardened in absolute alcohol.

In almost every instance the bacilli lay within those large, round lepra-cells described by VIRCHOW, which, separated from one another only by a fine network of connective tissue fibres, were closely pressed together. These cells, which are often about five times the size of a pus corpuscle, contain from 1 to 12 large clear nuclei remarkably like those of epithelial cells, and very often presenting the appearance of being unsymmetrically crowded towards one side of the cell.

The bacilli and their offspring are either uniformly distributed so as to pervade the entire mass of cell protoplasm, or (more commonly) several small circumscribed collections are found, in which bacteria to the number of six or seven are arranged endwise to one another. Sometimes, also, two or three of these groups lie end to end, producing the appearance of a long thread, which, of course, is not straight. Or the agglomeration of bacilli in all directions produces a heap so compact that only by minute examination is it possible to make out that it is composed of invading organisms. Notably one always finds in these cells not only slender, smooth bacilli, but an abundance of short bacteria and finely granular particles, to the special importance of which we shall later on have to refer.

In correspondence with the varying number and form of bacilli masses deposited in the cells, each cell also varies in size and chemical composition.

It has already been stated that the cells of lepra tumours invariably exceed in size white blood corpuscles or lymph cells, as whose descendants we now with even greater certainty than formerly consider lepra cells. I shall subsequently be able to prove conclusively that under certain circumstances (bacillus invasion) white blood corpuscles can produce forms differing in no respect from real lepra cells. Meanwhile, their origin from fixed tissue elements must not be regarded as impossible, although it still awaits strict demonstration. Examination of the infiltration itself affords nothing conclusive in respect of this question.

The deepest cell stratum, that is to say, the layer situated in the subcutaneous connective and adipose tissue, contains, besides many unchanged lymph cells, the youngest and smallest tubercle cells, enclosing relatively few bacilli in their protoplasm. To make up for their small number, however, they furnish us with a predominant number of specimens, either well preserved or in actual course of formation. Gradually advancing upwards, the cells increase in size and contain several nuclei, but never reach the condition of true epithelioid or giant cells. The protoplasm always remains more cloudy than in these last-mentioned forms. The oldest layers touch a stratum of sub-epidermic connective tissue dividing the infiltration of the corium from the plane epithelial stratum, which, deprived of its downward protruding rete pickles, is, though otherwise normal, deeply pigmented.

This uppermost layer contains a disproportionately large number of peculiarly large, round, sharply-defined heaps, which when unstained present a marked waxy brilliancy, while, on the other hand, they assume an almost homogeneous deep colouration in anilin dyes. There is some difficulty in explaining the occurrence of these "globi." In particular, when we examine under low powers unstained or carmine sections wherein the lumps are either very brilliant or (as often happens) are set with radiating margaric crystals, or stand out as yellow heaps from the red background, we might at first believe that we had before us a cross section of adipose tissue, so numerous are these spherical bodies among the meshes of a fine connective tissue fibrous network. Should the spheres fall out of the sections, the cavities left behind are all the more deceptive. This appearance, however, shows itself to be erroneous. For it is precisely the panniculus adiposus which contains such heaps in the smallest number, and then not in the proper adipose tissue, but in the connective meshes which divide the several fat lobules from one another.

The supposition that in these forms we have to do with ectatic lymphatic vessels stuffed with bacillus-thrombi is still more seductive. For, as already remarked, they lie distinctly limited in hollow spaces which are just as clearly defined. Indeed, the discovery of awl-shaped endothelial nuclei adherent to the walls points to the occasional reasonableness of this idea, while, however, the shape of the gaps as well as of the heaps, which is invariably round and never groove like, bears certain testimony against the lymph vascular character of the forms in question.

And, finally, anilin preparations show that globi consist of cells which are particularly densely stuffed with bacilli and their products, and have been brought into a state of degeneration. The formation of spaces is only apparent, and is probably due to retraction of the cell from its fibrillary environment during the process of hardening. Bacilli increase within a cell so long as the space it affords, and its nutritive conditions, permit. Thereupon molecular disorganisation of the bacteria begins, with the formation of a granular detritus, which, moreover, is capable of being stained, and whose uniform distribution mainly accounts for the uniform colouration of the tissue. This latter has, however, meanwhile undergone a chemical change, which shows itself, so far as staining is concerned, by an increased power of fixing gentian violet. I have not been able to produce the "distinct nuclei- and bacteria-colouration" which in other cases can always be obtained. The protoplasm always shared in the staining, though with it is, true, a reddish tinge quite distinguishable from the pure blue of the nuclei. This fact is of great importance during examination with a low power, when the redly shining spheres stand out beautifully from amid the blue infiltration. When I describe the process of eosin staining I shall have to note analogous facts.

The final issue of these cells (which, by the way, are very long-lived) is first a breaking down of the bacilli infiltration with preservation of the protoplasmic base. Later on, or through the operation of some special cause, such as an acute dermatitis, both cells and bacilli are destroyed. In the former case vacuolation, which has long occupied investigators, gradually becomes prominent, the above described arrangement of the bacilli in small isolated heaps being the necessary preliminary to its occurrence. That is to say, if the bacilli disintegrate slowly, with formation of granular detritus as an intermediate condition, and then disappear from the cells, this occurs by heaps, and there remains a large nucleated pale cell in which, when not stained, the former clearly defined situations of the bacilli heaps stand out

as clear spots, while colouring distinctly indicates the intervening borders. The cell, in fact, then resembles a heap of red blood-corpuscles whose limiting membranes have alone remained visible. The presence of transitional cell forms which have lost but few of these heaps, and consequently contain but a small number of vacuoles, as well as the varying size of the vacuoles, proves beyond doubt that the explanation now offered is the correct one, while my former assumption of a taking up of red blood-corpuscles by the lepra cells was erroneous. Hæmorrhage and the formation of pigment, with deposition of the latter between the cells and in the interstices of the connective tissue, play an important part only in the final stages of lepra processes, when the blood-vessels which in large numbers traverse the infiltration, and the infiltration itself,—that is to say, the cells and bacilli,—all alike perish. Nucleus disorganisation often preludes this event.

Besides large lepra cells, small connective tissue cells, now and then infiltrated with bacilli, are seen in rows traversing the infiltration, and then generally forming spindles of somewhat larger size than usual. Small cells, indistinguishable from "wandering cells," are also found. These are free from bacilli.

Active or mother cells are numerous, particularly in the deep layers of infiltrated connective tissue, and in the tissue tracts mounting up between the lepra colonies. The leprous infiltration itself is almost free from them.

I cannot avoid noticing a fact which is not yet intelligible to me, namely, that in some rare instances the number of bacilli was trivial in comparison with the degree of cell infiltration. It was perhaps due to faulty preservation, which indeed very seriously affects staining, or to the occurrence of non-leprous new growths, in a patient suffering besides from leprosy. It is true that no specimen was free from bacilli, but there seemed to be a strange disproportion between the quantity of new growth and the number of bacilli. For, on the other hand, in by far the greater number of specimens the marvellous multitude of bacilli present did not leave the slightest doubt as to the decisive part they played in the occurrence and character of the processes in question.

In opposition to what I formerly advanced, I must now admit that the discovery of bacilli free between the cells in the connective tissue tracts is very uncommon.

I have never yet been able to demonstrate bacilli with certainty in the blood-vessels. The whole arrangement of the infiltration, however, follows the direction of the framework of the ascending blood and lymph channels. Horizontal and oblique sections especially bring into clear relief this interdependence of the vessels and the cell masses which enclose them cylindrically, while the smaller vessels coursing through the centre of the infiltration have no particular influence on its distribution. In subcutaneous adipose tissue this distribution follows the arrangement of the lobules.

The sweat and sebaceous-glands are not primarily involved, and at most suffer only in consequence of the disease of the vessels and periglandular connective tissue. As regards the progress of alopecia (which, by the way, is limited to particular regions) I can give no information, for in all the material at my disposal atrophy of the follicles had already been fully established.

So also I have enjoyed but one opportunity of studying recent skin changes. From it I learned that absence of the papillary substance and of the rete-prickles should indicate a terminal condition. For in the tubercles there found the rete-prickles were visible as exceedingly exuberant protrusions deeply penetrating the corium, which was infiltrated with large round cells. Here also bacilli were present in large numbers and in excellent preservation.

B—The phenomena attending affections of the *buccal*, *pharyngeal* and *laryngeal mucous membranes* correspond so exactly with the descriptions given of the condition of the skin that details regarding them would simply take the form of a recapitulation. All that I find specially emphasised in my notes is the number and size of the globi and the enormous number of beautiful mother cells present.

C—Examination of the laryngeal mucous membrane further showed that the *epiglottis* and *thyroid cartilage* had undergone invasion by bacilli. From the perichondral connective tissue, whose slightly

enlarged spindle-shaped cells contained a multitude of bacilli, it was possible to follow chains of round cells, always infiltrated by bacilli, between the cartilage cells along the processes penetrating the cartilage. Free bacteria were, moreover, found in these connective tissue processes. In the thyroid, whose perichondrium had been invaded by bacilli, only free organisms had wandered into the substance of the cartilage, where they were finally visible in the interior of the corpuscles near the nucleus. Even here small globi had been formed. In these preparations the intermuscular connective tissue of the larynx also contained bacilli and globi.

D—The forms found in the *cornea*, which was rendered cloudy by the invasion of lymph cells spreading from the border towards the centre, presented the greatest similarity to those discovered in the cartilages. All these lymph cells contained delicate bacteria, and some isolated individuals were seen intruding between the corneal layers.

E—I was able in three new instances to confirm the occurrence of bacilli in large numbers in the *testicle*. In this group of cases I did not find organisms in the interior of the spermatic tubules, but they were present in the intertubular tissue. Once also I found them in the epididymis.

F—Cells containing bacilli were likewise found in the interacinous connective tissue of the *liver* in a case of recent interstitial hepatitis.

G—I have not lately examined the *spleen*. In my Norwegian cases, however, I described bacilli colonies as occurring in little heaps in connexion with large cells, and deposited in the neighbourhood of the follicles.

H—Many *lymphatic glands* showed very widespread and dense bacillus-infiltration in the peripheral zones, wherein also blood pigment was largely accumulated. The interfollicular passages especially contained large, many-nucleated, polygonal cells enclosing bacilli.

I—In a piece of *lung*, cheesy necrotic foci were found, free from bacilli. Many long chains of bacteria were present which had wandered in after death.

K—Most especially important, however, is the discovery of bacilli in the *peripheral nerves*, inasmuch as it classes with certainty under one pathological lesion, the tubercular and anæsthetic symptoms which have hitherto been clinically separated, and instantly explains the surprising variety of form presented by the disease. In most of my early nerve examinations my attempts to fill up the gaps in our knowledge had been fruitless, for I had always had before me old cases in the final stage, with sclerosis of the interstitial connective tissue and atrophy of the nerve fibres. After the experience gathered from investigation of the skin, it is unnecessary to dwell on the additional fact that the bacilli finally perish. Guided by their resemblance to those yellow masses in the testicle which are recognised as bacillus piles, I had already stated in my first publication that the "yellow masses" which I saw along with Professor HEIBERG of Christiania, and which simply correspond to the globi, were agglomerations of bacilli. By the death of a leprous woman from some intercurrent malady, I have lately enjoyed an opportunity of examining nerves at an early stage of the affection, and of thus establishing the identity which exists between the interstitial changes in the peripheral nerves and the leprous neoplasms in the skin. I was also able to ascertain the presence of bacilli in the large cells which had penetrated between the nerve fibres and bundles.

In the *spinal cords* which have hitherto been examined, though in rather an incomplete way, distinct circumscribed foci were found, which had led to destruction of nerve substance. But I am not yet in a position to say anything as regards the character of these foci. At all events, I consider it most probable that all the anomalies recognised as forming the complex of symptoms in anæsthetic leprosy should be referred to a primary interstitial lesion of the peripheral nerves caused by bacilli. These anomalies include disturbances of sensation, muscular atrophy with proliferation of nuclei and formation of interstitial connective tissue and fat, eruption of pemphigus bullæ, and mutilating affections of the joints.

II

In preparations hardened in alcohol but unstained, bacilli are not at the first glance visible. They are to some extent brought into view by free application of acetic acid, yet still so dimly that I am convinced they would have escaped me but for my previous knowledge that they were certainly present. Treatment with potash lye ($\frac{1}{12}$) gives far better results. The bacilli colour well, however, in gentian and methyl violets, but best of all in fuchsine. Weakly acid colouring solutions, or subsequent decolourisation in acidified alcohol, but especially treatment of the section with weak potash lye previous to staining, generally gives fairly distinct representations of the bacilli, which on the whole are difficult to stain. The intensity of the colouration is always much less than in the case of micrococci, which indeed is true of nearly all kinds of bacilli (EBERTH, WEIGERT), though lepra bacilli are still more rebellious to colouring matters than are then related forms. In gentian violet preparations protoplasm containing bacilli is distinguishable by its marked red tint from the blue nucleus.

Bismarck brown and all other brown and yellow dyes that I have employed fail completely to stain single bacilli in spite of all acid and alkaline modifications, such as the use of carbonate of potash, sulphate of zinc, alum, etc. Only the globi assume (just as all protoplasm does) a particularly strong colour in glycerine preparations. R. KOCH obtained slight staining with vesuvine.

Dahlia in acid solutions gives preparations that may be used.

Methyl blue (EHRlich), on the other hand, gives negative results as regards bacilli, but is specially adapted for the clear demonstration of vacuolation occurring in old lepra cells.

Neither nigrosin, aurantia nor methyl green stain bacilli.

Eosin does not colour single bacilli. On the other hand, an acid mixture of eosin and hæmatoxylin* may be used with great advantage. The sections are washed in water after staining, and then decolourised with alcohol. The nucleus then exhibits a beautiful blue tint, the ordinary cell protoplasm is eosin-rose, while the protoplasm of the cells containing bacilli is prominent by its clear orange, so that even with low powers the presence of bacilli can be established. Carmine stains neither bacilli nor globi, but rather indicates the latter in the skin, in the detritus of the spermatie tubules and among the bundles in peripheral nerves, as uncoloured, shining, yellow masses visible on the red background.

I should remark that lately in all my preparations the bacilli were often decolourised even after 24 hours, whether I had employed alcohol or oil of cloves or Canada balsam with or without chloroform. Light has no influence. On the other hand, certain sections furnished, two or three days after their preparation, much plainer images than directly upon being mounted. I have also sections in my possession which have now lasted for nearly two years in unchanged good condition. I have been unable to ascertain with certainty the reason of this variable behaviour, which must undoubtedly depend on the choice of staining agents and the different methods of hardening adopted, but in the interest of future investigations I have considered it my duty to call attention to this remarkable inconstancy in the results of staining.

III

The micro organisms when brought into view by the methods described (hardening in alcohol, staining in watery anilin solutions, decolourisation in absolute alcohol, oil of cloves, Canada balsam) appear

* I am indebted to EHRlich's memoir for the following formula —

I — Eosin	0 5	II — Hæmatoxylin	0 5
Distilled water	100 0	Absolute alcohol	100 0
Alum	2 5		
Glycerine	100 0		

Mix I and II, then after three days, during which the mixture remains exposed to the light, add 2 per cent of glacial acetic acid.

as very fine, slender rods, now and then slightly tapering at both ends, measuring in length about one-half or three quarters of the diameter of a human red blood corpuscle, and in breadth about one fourth or less of their length. Rectilinear or slightly curved, they bear most resemblance to the minute bacilli which KOCH has figured in the septicæmia of the mouse, but the forms I describe are not so delicate as his.

In the place of a slender, uninjured bacillus we very frequently find small granular particles. These may be disintegration products, and in that case they are quite irregularly distributed through the protoplasm, and are of variable size, or the granular appearance is the sign of a progressive advance,—in fact, of a propagation. Finally, the presence of a comparatively wide mucoid sheath may be demonstrated.

For the study of these conditions we may employ the following methods —

A —Dry preparations of tubercle juice and of the pus as found in ulcers produced by the breaking down of tubercles. This pus is always rich in bacilli.

These dry preparations, however, offer very different appearances, according to their mode of preparation.

1 *When water is employed* (KOCH) —The specimen is stained, the surplus colouring matter is washed away with water, and after drying, the preparation is mounted in Canada balsam.

2 *When alcohol is used* —After staining, the preparation is decolourised with alcohol. Then it is either (a) dried and examined in Canada balsam, or (b) it is immersed in oil of cloves, and subsequently mounted in Canada balsam.

The differences in the results of these two processes are very striking. In specimens prepared with water we see, both in the cell protoplasm and in the extracellular dried tissue juice, clear linear gaps exactly corresponding in size and arrangement with the well-known appearance of bacilli-charged cells. It only occasionally happens that the lumen of these chinks is not empty, but is occupied by a stained bacillus. The chinks are not of uniform length, but are always longer than they are broad. They are oval or go off to a point at one end in a drop-like or conical fashion.

Starting from the fact often observed by KOCH that, during drying, micro organisms burst away from the covering glass, I had in my previous memoir considered these chinks as relics of escaped bacilli, and therefore hypothetically assumed the existence of a mucoid sheath.

This explanation now proved to be erroneous. For when a specimen, which when prepared with water exhibited only chinks, was subjected to treatment with alcohol, the presence of bacilli in large numbers could be demonstrated. Instead of clear spaces, the ordinary appearance presented itself of bacilli embedded in the protoplasm or free in the tissue juice.

At all events, this difference between the results of decolourisation by water and by alcohol proves that we have to do with a mucoid sheath loosely enveloping the entire bacterium. It is less easy to explain why the bacilli should become stained by the alcohol process. The hypothesis which at first sight seems most plausible, namely, that the mucoid sheath preventing colouration in the water process is removed by the alcohol, proves untenable, for the application of alcohol before staining does not induce subsequent colouration of the bacilli.

Perhaps the phenomenon depends on that inversion of staining, produced by alcohol, which has already been described by EHRLICH.

It is unnecessary to dilate on the advantages which the transparency and distinctness of these preparations offer for the study of bacilli.

It has to be remarked, in conclusion, that live, moving bacilli are always broader than dried ones, and the latter shrink still further when alcohol is used in their preparation.

B —Breeding experiments

1 A tubercle still covered by unbroken skin is thoroughly cleansed with alcohol and excised. Having been removed with the most minute precautions against outside contamination, it is divided with needles purified in the lamp. Three courses may then be adopted —

a Cultivation in blood serum in good-sized object cells with a plentiful supply of air

b Cultivation in blood serum with faintly alkaline and sterilised solution of meat extract, in test tubes which have been carefully purified with acids and boiling

c Cultivation under a covering glass with blood serum, precautions being taken against evaporation

All these preparations are kept continuously in a warm chamber at a temperature of 35° to 39° C

2 Pus and tubercle juices, protected from chance contamination, by enclosure in hermetically sealed glass tubes with a sufficient quantity of air, may be cultivated in these same tubes

C —Artificial necrosis of the tissue. Freshly excised tubercles* are introduced into the peritoneal cavity of a living rabbit. Provided antiseptic precautions are adopted, this has no injurious effect on the animal, peritonitis etc never occurring. But through the influence of the living lymph the fragment introduced undergoes a metamorphosis of its chemical properties. That is to say, nuclei wither in a peculiar manner (WEIGERT), and cannot subsequently be stained. After from four to eight days the animal is killed, and the fragment, which is now enclosed in a capsule of connective tissue, is hardened and examined in the usual way. The fundamental tissue does not stain in the least, so that the colouration of the bacilli is all the more distinct, and they stand out with the utmost clearness†

By the three modes of investigation just described (examination of dried preparations, cultivation, and artificial tissue destruction), results were obtained which I have endeavoured to detail and criticise in the most practical way. The difficulty encountered in cultivating these bacilli is very great, in consequence of the minuteness of the organisms, and it is moreover impossible to trace the fungi through the stages of their growth in living specimens. For culture must be interrupted and the specimen dried and coloured before examination is attempted. Then, again, we are without any reliable test of the accuracy of the investigations made, a test such as is afforded by the inoculation of animals in the case of bacillus anthracis, which would protect us against confounding the bacteria in our preparations, which we wish to describe, with others introduced by chance admixture. I have therefore been restricted in every case to visual comparisons when deciding as to whether in a given instance true leprosy bacilli and then progeny were present. With regard to breeding experiments in particular, I would suppress their results, in spite of the conviction which I personally entertain, had I not been again and again able to confirm by preparations in which contamination was impossible (viz, in dry preparations of tubercle juice, and in sections of lepra tubercles which had been lodged in an animal's peritoneum) the results obtained by cultivation.

I must add to what has been said about bacilli which have not been subjected to manipulation, that (as HANSEN has already stated) they exhibit movements in tubercle juice and pus extracted by pressure. I cannot positively decide whether they manifest merely an oscillatory motion to and fro, or at the same time rotate round their long axis. But my belief is that the latter supposition is the more probable, for which I shall give my reasons later.

Besides smooth bacilli, two forms are found —

1 Rods with a globular enlargement at one end or at both ends or in the middle. These bacilli, which are often provided with several enlargements, vary much in length. If a slender normal bacterium be taken as unity, then those presenting a single enlargement are longer than the unit, but less than twice as long, while the many-globulated filaments are more than double the length of the unit. These filaments

* It results from SENFTLEBEN'S experiments that morsels previously hardened in alcohol are also suitable for this purpose. Of the accuracy of this I have convinced myself.

† I am at present engaged in testing this method in the course of other bacterial investigations.

are seldom rectilinear, they generally form an obtuse angle at the point of enlargement, but some are found wherein the enlargement forms the apex of a very acute angle. Again, there are rods which, instead of a globular enlargement at one end, present rather a lance-shaped prolongation, which starts from a broadened base, so that its tapering is sudden. Nearly every lepra cell contains such globules free in its interior, along with lanceolate or drop-like or conical forms in very large number. Hence we must not forget the possibility of confounding them with bacilli which are looked at perpendicularly from above.

These forms are also found free in prepared specimens of the fluids. Since dry preparations are largely decolourised by the alcohol and oil of clove treatment, while these granules always stand out very clearly as well-stained spheres, etc., sharply defined, and which can easily be distinguished from amorphous detritus, they also may perhaps be regarded as the progeny of bacilli.

Bacilli provided with globular enlargements exhibit movements when in the fresh state. In those containing a granule in the middle, and especially when the halves are inclined at an angle, a distinct whirling motion may be observed, which indicates rotation round their long axis. The addition of water makes the movement much more active (HANSEN).

2 The second form exhibits the following condition — In the direction of the length of the bacterium, one, two or three clear unstained gaps are seen, which, as a rule, occupy the entire breadth, but are limited by a barely visible wall. Now and then the clear spot seemed to be placed unsymmetrically, closer to one border than to the other.

When only one clear spot existed it lay nearer to one end than to the other, but never quite at the point. To the uncoloured zone there was often attached not a normally broad continuation, but a lanceolate prolongation. I also sometimes saw two smaller bacilli, diverging from one another at an acute angle, apply themselves to the uncoloured region, and it seemed that they were not so placed by mere accident, but that they had combined to form a Y-shaped system.

The clear spaces are always smaller than the coloured intermediate parts. Thus, there would be $\frac{2}{5}$ coloured, $\frac{1}{5}$ uncoloured, $\frac{2}{5}$ coloured, or $\frac{2}{8}$ coloured, $\frac{1}{8}$ uncoloured, $\frac{2}{8}$ coloured, $\frac{1}{8}$ uncoloured, $\frac{2}{8}$ coloured. I found no isolated clear spherules with bounding surface alone stained.

Bacteria containing several chinks are always larger than the ordinary smooth bacilli, while such as contain a single chink are found among the smaller specimens.

Formerly I investigated only sections which had been prepared in the usual way. In these, it is true, bacteria with chinks and spherical enlargements came under my notice, but their appearance was explained erroneously in a manner which can be accounted for by the methods employed. I then wrote "In the later stages we observe disintegration of the bacterium into granules which retain their longitudinal arrangement for a considerable time, perhaps in consequence of possessing a mucoid sheath, which, it must be confessed, is not visible in alcohol preparations. Whether this granulation does not indicate spore formation, and thus a process of development, rather than a regressive metamorphosis, is a question which it is necessarily impossible to decide by the study of dead material."

Now, however, we can arrive at a decision in an affirmative sense. Besides molecular disintegration of bacteria, there occurs a formation of spherules and chinks, and thus it is not the stained portions but the unstainable intermediate regions which present us with new facts. In this connexion, dry preparations after simple water treatment were specially demonstrative whenever the contents of the mucoid sheaths which formerly looked like linear chinks had by chance shared in the staining. In that case one often sees within the compass of a cell, a gap containing two or three bacilli, one of which may be unchanged, another with clear unstained intermediate parts, and so on. Moreover, short spaces are found with correspondingly short, conically-pointed contents.

There is, finally, a third mode of growth which came under observation alike in cultures and in tubercles introduced into the peritoneum. This is the stretching of bacilli into filaments about four times

as long as an ordinary bacterium. These lay together in heaps parallel to one another or irregularly interlacing, just as do ordinary bacilli. Bacilli massed in thongs were also found in the chamber cultures. I was never able, however, to satisfy myself as to spore formation in these filaments.

Such are the results of my observations in the matter of development. After frequently repeated tests, I have no doubt as to their validity.

There are familiar analogies which we may draw from many bacillary forms in illustration of the various stages here described. We thus gain more confidence in the assumption that globular and "fissure-bacilli" are spore formations. Thus, for instance, in one of KOCH's photographs, "a small cylindrical bacillus with four equidistant spores" is an excellent representation of the objects we are considering. The spheroidal spores are also represented in the same plate.

In regard to pathogenic bacteria, the bacillus malarie offers, perhaps, some analogies. More particularly, the remarkable phenomenon of two modes of development, viz, spherule- and gap-formation, is found in this organism likewise.

No matter how exact the above detailed isolated observations may be, I nevertheless consider it impossible to construct from them the complete developmental history of the bacillus leprae. Inasmuch as the causes which sometimes produce spherical spores and sometimes gap formation remain hidden, while progressive development could never be watched in any individual bacillus, I refrain from discussing in a hypothetical way a matter which can be cleared up by observation only.

So far we have been able to establish that a definite, typically recurrent bacillus-form is found wherever leprosy new growths exist, and, further, that in the body, just as in cultivations, this bacillus is propagated by spores. It remains now to show —

- 1 That these bacilli and spores are the cause of the new growths
- 2 The route along which they spread within the body

IV

No direct proof of the first proposition can be assigned, such as may be set forth in the case of splenic fever. Yet the assumption is so well supported, despite all the defects in our botanical knowledge of the fungus, that leprosy as a disease produced by bacilli may safely be ranged in the class of acknowledged bacterial diseases along with relapsing fever, ulcerative endocarditis, etc.

In the first place, there is the absolute constancy wherewith the bacillus is found in all leprosy new growths, and the nearly invariable presence of a quantity of fungus corresponding in its abundance with the extent of diseased tissue. This fact presented itself over and over again in the same convincing manner during the study of lepra material from Norway, Spain, Guyana, India, Roumania, Brazil and Palestine.

We shall, moreover, be able to prove that as a consequence of the presence of bacillus leprae the normal developmental progress of a wandering cell into a connective tissue cell sustains an alteration which results in the formation of what, after VIRCHOW, we shortly indicate by the term lepra cell. If such a relation may invariably be observed, we are justified in concluding that the specific form and nature of the lepra cell are etiologically decided by the specific bacillus.

I appeal here to two series of observations —

A — Investigation of the granulations which spring up after the loss of substance caused by excision of a broad skin tubercle.

In a perpendicular section stained in the ordinary way the lower stratum is very rich in cells as compared with the superficial portion. The latter, moreover, contains no blood-vessels, which lower down are very numerous and of large size, quite out of proportion to the thickness of their walls. The cells are embedded in an uncoloured filamentary matrix which looks like coagulated fibrine, and are generally of the size of a white blood-corpuscle. They

contain a large, deeply-tinted nucleus which nearly fills the interior of the cell. Now and then, instead of this single nucleus several small nuclei are present. At the same time epithelioid cells of the most varied forms are plentiful, especially in the neighbourhood of the blood-vessels, and, finally, we find some young spindle shaped connective tissue cells fully grown.

In remarkable contrast with these small cells, there are others five or six times as large, with very bulky, clear vesicular nuclei, and containing a large number of beautiful smooth bacilli with or without spheroidal spores.

Sometimes these cells appear to lie singly or in groups within chinks in the matrix. Giant cells possessing three or four nuclei, and with or without bacilli, are not uncommon. Besides well-preserved rods there are also smaller conically-tapering corpuscles, which are not to be confounded with bacilli that are looked at obliquely or vertically. I would add that granulations spring up very quickly on leprosy excision wounds. Cicatrization is long retarded by the formation of a crust of dried granulations.

B—Experiments on animals seem to me still more decisive. These were performed fourteen times on rabbits and five times on dogs. On the 6th November a freshly extirpated tubercle was, with strictly antiseptic precautions, introduced into the peritoneal cavity of a rabbit, and the animal was killed on the 11th. Postmortem examination revealed the fragment enclosed in an extremely vascular connective tissue capsule attached to the great omentum. Under the microscope I found that the original mass of tubercle had been destroyed by necrosis. No nucleus was made visible by staining. It was only the arrangement of the well coloured bacillus piles that still indicated the position of the tubercle cells which had previously formed the groundwork. Next in order, externally, there was a zone of granular detritus so densely heaped together that amid it it was impossible to make out anything about bacilli. In the connective tissue region next following, I could trace in layers from the centre to the periphery all the stages of inflammation and of inflammatory connective tissue development up to the formation of the ordinary, small, clear, caudate connective tissue cells. This region contains, in considerable numbers, remarkably large, round, elliptical and elongated bacilli-charged cells, with large, clear nuclei. As regards their form, they occupy an intermediate position between epithelioid and fully grown connective tissue cells. In the newly-formed finely filamentous connective tissue of the enclosing capsule there are, moreover, unmistakable bacilli-charged cells in which bacteria, either in little heaps or scattered singly, lie near the nuclei. Bacilli-charged cells can everywhere be distinguished by their size and by their arrested development, as compared with neighbouring coeval cells of the same layers. It is also worthy of notice that the bacilli chiefly assume the form of smooth, intact bacteria.

Although in the rabbit these large bacilli-charged wandering cells soon perish, so that when the experiment was prolonged no trace of them was to be found in the connective tissue capsule, a new leprous formation is obtained in the case of dogs.

In these latter the subcutaneous connective tissue was chosen for the deposition of freshly removed tubercle. In one animal the piece introduced had at the end of 21 days disappeared without leaving a trace. A second, operated upon on the 16th October, died on the 18th November. A delicate, yellowish-brown fragment about the size of a lentil, and surrounded by filamentary connective tissue, was found under the scar. Microscopically examined it exhibited clear cells, with round, bulky, moderately dark stained nuclei, densely infiltrating a fine filamentary connective tissue. All these cells, which in size greatly surpass wandering cells, and give the impression of being very young, contain many bacilli and small rather granular forms. On the border of this mass, consisting of oval cells, thin layers of spindle-shaped connective tissue cells, closely pressed together, are deposited, whose protoplasm also occasionally contains bacilli. Blood-vessels were distributed in fair numbers through the little tumour.

More interesting still was the result obtained in the case of a fourth dog, operated upon on the 16th October, and killed on the 6th January, wherein, even during life, a slowly-increasing tumour could be felt under the scar of the incision. Macroscopically, a bean-sized tumour, yellowish grey, and of firm consistence, was distinguishable from the surrounding connective tissue, but was above continuous with

the scar in the corium Under the microscope this tumour was found to consist of very voluminous epithelioid cells, which were undoubtedly leprosy, but nowhere was there a trace of bacilli to be found

So far as I can see, these results are susceptible of but one explanation Inasmuch as transplanted human tubercles are incapable of living so long as from 4 to 11 weeks, the tumours discovered must have been newly formed Specially demonstrative of this is the fact that all the nuclei stained well and regularly, though we know that the nuclei of cell masses always vanish when introduced into a living body Hence the leprosy substance introduced must have been absorbed, and replaced by a new growth This new growth originated in an inflammatory process whose immediate products,—namely, wandering cells,—pursued a specific course in two directions under the active influence of the intruding bacilli On the one hand, development tending to the genesis of connective tissue was arrested at an incomplete stage, which but rarely advances to the formation of spindle shaped paratypical connective tissue cells On the other hand, we find something specific in the persistency of single cells whose tardy development harmonises with the sparsity of the newly-forming blood-vessels This observation is confirmed by the fact of the long unchanged condition of leprosy nodules in man

That in the case of these dogs we had to deal with a true local leprosy in the animals used, seems to me so certain that even from the instance of new growth without bacilli related as the second case, I should be disposed to draw a converse conclusion This result proves, in my opinion, that leprosy bacilli produce specific neoplasms from which the bacilli, after they have discharged their special functions, disappear as such, and that inasmuch as the bacilli may either have perished or have assumed the transitory condition of spores, the absence of organisms does not of itself pronounce against the leprosy character of a neoplasm Such observations cannot be made in men, as in their wandering cells and nutritive juices the bacillus finds the material necessary to its development, and so leprosy becomes a constitutional disease In dogs, to judge by the experiments hitherto made, the chances of general infection are limited, nothing more than local, transitory leprosy neoplasms being producible Yet the possibility, after more extended trials, of imparting generalised leprosy to dogs must not therefore be denied Rabbits seem totally incapable of nourishing the bacilli, death of transplanted fungus masses being at the farthest but a question of days Attempts to produce infection by introducing leprosy material into the interior chamber proved fruitless Little masses which had been transplanted with so many precautions that they caused no inflammation or other trouble, remained nearly unchanged for 62 days, showing only a hardly perceptible diminution in size

V

As regards the course pursued by the bacilli when distributing themselves through the body, there are two routes open, namely, the blood-vascular system and the lymphatic system

Under ordinary circumstances, the blood, according to all the observations that I have hitherto made, does not, however, seem to offer a channel to either bacilli or spores

- 1 Tissue preparations never gave any satisfactory evidence of the presence of bacilli or spores
- 2 Examinations of blood, fresh, dried and stained in all possible ways, invariably gave negative results
- 3 Breeding experiments made with blood drawn from the healthy portions of a patient's skin were fruitless On the other hand, unmistakable bacilli developed in the most satisfactory manner in blood obtained by puncturing tubercle nodules Whence it follows that it was not in the blood itself* that the

* I cite here an adverse opinion On the 11th December 1880 MM GAUCHER and HILLAIRET communicated the results of their investigations into the subject of leprosy parasites to the Société de Biologie They found in blood drawn from the point of the finger, and especially from tubercles, a tolerably large number of bacteria, most of which were moving, some punctiform, others rod like, with occasional small rows of monads lying in groups of two or three They were successful in cultivating the bacteria Blood preserved between two glasses contained, when examined at the expiration of three weeks, a considerable number of motionless monads, chains of articulated monads, bacteria, and even long branched filaments, which for the most part appeared to be jointed in several places, and were on the whole suggestive of mycelium filaments

spores were sheltered, but that by puncture of the nodule, other material containing spores was permitted to mingle with the blood as it flowed

Such nodule blood when dried and examined showed only an increase of white blood-corpuscles, which appeared under two forms —

a Large cells with clear protoplasm and several small nuclei, which, like pus-corpuscles, assume all possible forms

b Smaller round cells with a large oval nucleus, the protoplasm containing delicate, well-defined, distinctly-stained granules (spores?) in remarkable numbers

Breeding experiments from this blood—

1 In object cells,

2 In capillary tubes sealed at both ends, with a sufficient supply of air,

3 In test tubes,

yielded forms which appeared to me to demonstrate indubitably the growth of bacilli from small conical granules

I reproduce the notes of one experiment —

Blood drawn 25th November Tube opened 5th December, and several dry preparations made, which were mostly stained with gentian and afterwards treated with alcohol No blood-corpuscles plainly visible From the diffused clear blue mass isolated violet-red heaps stand out, which under a $\frac{1}{2}$ oil immersion lens by ZEISS and No 2 eyepiece can hardly be resolved into their ultimate constituent elements With eyepieces 4 and 5, however, small, elongated, conically-pointed corpuscles lying close together in heaps, are everywhere manifest In breadth they correspond with the bacilli On one side of the pile delicate bacteria, indistinguishable from lepra-bacilli, are clearly recognisable In Bismarck brown the mass stains as a whole, but not the separate elements

In spite of the most careful examination and trials constantly renewed, control-breeding experiments with blood drawn from healthy persons invariably gave negative results

I presume, therefore, that spores from the lymphatic lacunæ, and especially from the lymphatic spaces surrounding the capillary network, mingled with the blood drawn for cultivation, and I also conclude that it is the lymph vascular system which commonly opens a route to the spores

In favour of this view I may further call attention to—

1 The arrangement of infiltrations round the adventitia of the blood-vessels, which, as is well known, contains lymph spaces, while no bacilli could be demonstrated satisfactorily in the blood-vessels themselves

2 The clinical fact that not only the first manifestation of tubercular eruptions on the skin, but also then subsequent outbursts, are attended by erysipelatous dermatites, which, especially since KOCH's recent researches, we recognise as affections of the lymph vascular system Norwegian and Spanish observers are unanimous in asserting that suppuration does not occur, and this enables us to mark off the special character of this affection, which is allied to erysipelas On the other hand, the skin inflammations tend to local recovery in the regions attacked, the tubercle disappears, leaving brown patches behind, which contain much amorphous blood pigment But they always produce an aggravation of the general process with renewed leprous eruptions in other portions of the skin, or, in other words, a great migration of fungi from one region to another

It is worthy of consideration whether, under this erysipelatous condition, the blood-vascular system may not share in the transport of spores I have, unfortunately, had no opportunity of examining and cultivating blood drawn from unaffected portions of the skin during this state of things

The results of treatment by application of chrysophanic acid also show that superficial dermatites are followed by the resorption phenomena described

3 Experiments on animals, as fully detailed above,—namely, introduction of freshly extirpated tubercles within the bodies of rabbits and dogs,—prove that migration of bacilli and spores occurs without the co-operation of the blood-vessels

Bacilli are found in the cells of the connective tissue capsule far removed from the centrally-enclosed tubercle. They could have got into this position only by themselves wandering in the inter-cellular spaces,—where, in fact, they were discovered,—or by the intermediary of centrifugally travelling white blood-corpuscles.

We may presume that it is only spores that are transported, while local advance of leprosy infiltration is effected by the peripheral migration of bacilli, as, for instance, in the cornea.

Certain tissues enjoy a physiological immunity from bacillus-invasion. Such are all epithelial structures, hair [skin] glands and rete Malpighii.

We cannot as yet explain satisfactorily, on anatomical grounds, the interesting facts recorded by Dr BOECKMANN of Beigen. He found that [during bacterial invasion] of the cornea, opacity spreading from one limb halted at the scar of a dissection wound, so that the portion lying on the other side of the cicatrix remained transparent. We must at any rate admit that the scar hindered the further march of the bacilli.

4 Finally, the remarkable tumefaction of lymph glands that are densely stuffed with bacilli, and their great sensitiveness to pain during the course of the erysipelatous affections above described as accompanying each outburst, support the assumption that the lymph-vascular system is the channel along which spores and bacilli advance.

In but one manner can we admit that the blood-vessels co-operate. The inflammatory alteration of the vascular walls produced by the bacilli and spores present in the perivascular lymph spaces, favours diapedesis, and so supplies white blood-corpuscles to form the foundation for leprosy neoplasms.

VI

From all the considerations above enumerated, the following conclusions may be derived —

1 Leprosy is a genuine bacterial disease dependent on a specific bacillus form. In favour of this are to be cited the constancy and certainty wherewith bacilli are found, their special character, their occurrence in all the organs attacked, and in quantity corresponding with the severity of the disease, the fact that the specific properties of lepra cells can be artificially reproduced by the introduction of bacilli.

2 These organisms enter the economy either as bacilli, or, more probably, as spores. They remain in an incubative stage, which varies in duration according to circumstances, deposited in some place of refuge, perhaps the lymphatic glands. The duration of incubation is remarkably variable when studied in cases of leprosy itself, and is especially so when compared with that of other infective diseases. The physiological resistance of the human system is the more marked as the power of growth displayed by the bacilli is less. Incubation and subsequent career appear, however, to be much more rapid in tropical regions than in European lepra districts.

3 From these places of refuge invasion of the body occurs, chiefly at the expense of—

a The skin (*lepra tuberculosa*), as in the case of variola, syphilis, etc. The regions which under other circumstances are obnoxious to external lesions are special seats of lepra predilection, for instance, the face, hands, elbows and knees.

b The peripheral nerves (*lepra anæsthetica*). The muscular symptoms and trophic disturbances correspond to those with which we are familiar in other diseases of peripheral nerves.

c Other organs, such as the testicle, spleen, cornea, cartilage and liver. These share to a less extent in the process.

4 Bacilli or spores produce inflammation of vascular organs, and in non-vascular organs there is centripetal invasion from the periphery. The lymph cells (and fixed elements?) then supply material for the leprosy neoplasm. Through the specific operation of bacilli, wandering cells become lepra cells, characterised by the peculiarity of their form, course and termination.

5 From these premisses we may assert the probability of leprosy being a disease of infection, and contagious by means of its specific products. These are tubercle cells, tissue juice and pus containing

bacilli or spores that are capable of living. Not every specimen of pus taken from a leprosy patient is infective. It may contain no bacilli, and be just as little infective as the contents of pemphigus bullæ.

The disease, of course, is not only directly contagious but may also be communicated indirectly through any articles conveying bacilli or spores. I have already insisted on the fact that in leprosy, more than in other bacterial diseases, individual susceptibility is an important consideration.

On the other hand, leprosy is not, in my opinion, transmissible by inheritance.

[*Memorandum*—In France, M. CORNIL has lately paid much attention to the organisms associated with leprosy. He fails to find them in the epidermis, and he thus explains the non-contagious character of the disease. He reports that in one of his observations the tissues were so stuffed with bacteria and so changed thereby that it was difficult to determine what organ was under examination. The organisms presented themselves under the forms of spores, excessively small and delicate rods, bulky rods containing granules, long filaments formed of articulated bacteria, the joints being separated by transparent partitions, etc. The lesions explicable by the presence of parasites are divisible into three series. In the first are placed the formation of leprosy tubercles, and the occurrence of leprosy infiltration characterised by the invasion of multitudes of large cells crowded with delicate bacteria. When a soft organ such as the liver, or a cavernous organ like the testicle, is thus infiltrated, the bacteria, encountering no resistance, assume a very large size. Blood circulation is diminished or abolished, and the capillary vessels are filled with bacterial infarcts. Hence the infiltrated tissues become almost gangrenous, and ulcerate when they form part of the skin or of a mucous surface. To the second series belong lesions of fibrous tissues, such as the cornea, sclerotic, peripheral nerves, arterial coats, etc. Here the bacteria send long filaments into the connective interstices between the lamellæ. These filaments may attain the length of $\frac{1}{10}$ millimetre. Some present a globular enlargement at one end, and contain transparent elements which are probably spores. The fixed cells of the invaded tissue are but slightly, if at all, changed, but sclerosis is frequently produced by thickening of the connective layers. Finally, free or aggregated spores are to be found in the protoplasm of cells, in the detritus of the spermatic tubules, and in the blood-vessels.

In clinical confirmation of the parasitic nature of the disease, M. LABBE claims success for a treatment consisting of daily repeated subcutaneous injections of carbolic acid.]

CHINA.

IMPERIAL MARITIME CUSTOMS.

II.—SPECIAL SERIES: No. 2.

MEDICAL REPORTS,

FOR THE HALF-YEAR ENDED 31ST MARCH 1882.

23rd Issue.

PUBLISHED BY ORDER OF
The Inspector General of Customs.

SHANGHAI
STATISTICAL DEPARTMENT
OF THE
INSPECTORATE GENERAL
MDCCCLXXXII

INSPECTOR GENERAL'S CIRCULAR No 19 OF, 1870

INSPECTORATE GENERAL OF CUSTOMS,

PEKING, 31st December 1870

SIR,

1—It has been suggested to me that it would be well to take advantage of the circumstances in which the Customs Establishment is placed, to procure information with regard to disease amongst foreigners and natives in China, and I have, in consequence, come to the resolution of publishing half-yearly in collected form all that may be obtainable. If carried out to the extent hoped for, the scheme may prove highly useful to the medical profession both in China and at home, and to the public generally. I therefore look with confidence to the co-operation of the Customs Medical Officer at your port, and rely on his assisting me in this matter by framing a half-yearly report containing the result of his observations at upon the local peculiarities of disease, and upon diseases rarely or never encountered out of China. The facts brought forward and the opinions expressed will be arranged and published either with or without the name of the physician responsible for them, just as he may desire.

2—The suggestions of the Customs Medical Officers at the various ports as to the points which it would be well to have especially elucidated, will be of great value in the framing of a form which will save trouble to those members of the Medical profession, whether connected with the Customs or not, who will join in carrying out the plan proposed. Meanwhile I would particularly invite attention to—

a—The general health of during the period reported on, the death rate amongst foreigners, and, as far as possible, a classification of the causes of death.

b—Diseases prevalent at

c—General type of disease, peculiarities and complications encountered, special treatment demanded.

d—Relation of disease to $\left\{ \begin{array}{l} \text{Season} \\ \text{Alteration in local conditions—such as drainage, \&c} \\ \text{Alteration in climatic conditions} \end{array} \right.$

e—Peculiar diseases, especially leprosy.

f—Epidemics $\left\{ \begin{array}{l} \text{Absence or presence} \\ \text{Causes} \\ \text{Course and treatment} \\ \text{Fatality} \end{array} \right.$

Other points, of a general or special kind, will naturally suggest themselves to medical men, what I have above called attention to will serve to fix the general scope of the undertaking. I have committed to Dr ALEX JAMIESON, of Shanghai, the charge of arranging the Reports for publication, so that they may be made available in a convenient form.

3—Considering the number of places at which the Customs Inspectorate has established offices, the thousands of miles north and south and east and west over which these offices are scattered, the varieties of climate, and the peculiar conditions to which, under such different circumstances, life and health are subjected, I believe the Inspectorate, aided by its Medical Officers, can do good service in the general interest in the direction indicated, and, as already stated, I rely with confidence on the support and assistance of the Medical Officer at each port in the furtherance and perfecting of this scheme. You will hand a copy of this Circular to Dr _____, and request him, in my name, to hand to you in future, for transmission to myself, half-yearly Reports of the kind required, for the half-years ending 31st March and 30th September—that is, for the Winter and Summer seasons

4.—

*

*

*

*

*

I am, &c ,

(signed)

ROBERT HART,

I G

THE COMMISSIONERS OF CUSTOMS,—*Newchwang, Ningpo,*
Tientsin, Foochow,
Chefoo, Tamsui,
Hankow, Takow,
Kuikiang, Amoy,
Chinkiang, Swatow, and
Shanghai, Canton

SHANGHAI, *1st September 1882*

SIR,

IN accordance with the directions of your Despatch No 6 A (Returns Series) of the 24th June 1871, I now forward to the Statistical Department of the Inspectorate General of Customs, the following documents —

A special article on Filaria Disease, pp 1-16

Report on the Health of Amoy, p 17,

Report on the Health of Hoihow, pp 30-32,

Report on the Health of Foochow, pp 35-37,

Report on the Health of Shanghai, pp 41-43, each of these referring to the half-year ended 31st March 1882

Report on the Health of Canton for the eight months ended 31st March 1882, pp 33, 34

Report on the Health of Takow and Taiwan-fu (Anping), pp 18-29,

Report on the Health of Kiu-kiang, pp 38-40, each of these referring to the year ended 31st March 1882

I have the honour to be,

SIR,

Your obedient Servant,

R ALEX JAMIESON

THE INSPECTOR GENERAL OF CUSTOMS,

PEKING

The Contributors to this Volume are —

P MANSON, M D, CH M

Amoy

W W MYERS, M B, CH M

Takow and Taiwan-fu

E A ALDRIDGE, L K & Q C P I

Hoihow

F CARROW, M D

Canton

J A STEWART, M D

Foochow

G R UNDERWOOD, M B, CH M

Kiukiang

R A JAMIESON, M A, M D, M R C S

Shanghai

, 'NOTES ON FILARIA DISEASE --

By PATRICK MANSON, M D

SINCE my last Report on the subject of filaria disease was written, I have availed myself of opportunities as they have presented themselves from time to time to extend previous observations, and to elaborate or confirm what others or myself have already recorded. The results of most of this work I have brought together in the following notes. As my object has been merely to fill in gaps in our knowledge, and not to attempt a complete history, I have avoided, as much as possible, repetition of what has already appeared in these Reports or elsewhere. Thus my notes may seem disconnected and be unintelligible to the reader who is not already acquainted with what has been done. Such an one I would refer for fuller information to the writings of LEWIS, COBBOLD, and others, and to former numbers of the *Medical Reports*. Many of the observations are published now for the first time, others, again, have appeared in a different form in various home journals. I thought it advisable, however, as I may not have an opportunity for some time of continuing this work, to give others the benefit of what I have stumbled on, and to bring, incomplete though many of the observations may be, these Reports, as far as my own work is concerned, up to date. The subject is a new and an expanding one, and therefore fresh information, no matter how crude and imperfect, may prove useful and suggestive.

FILARIAL PERIODICITY

In a former issue of these Reports† I pointed out that singular phenomenon in the history of *filaria sanguinis hominis* which has come to receive the name of *filarial periodicity*. I therein gave part of the evidence on which my assertion of the existence of such a phenomenon was founded, and I ventured to make some suggestions as to its meaning in relation to the life-history of the parasite, and as to what becomes of the animal during its temporary absence from the general circulation. Although the evidence was somewhat fragmentary, yet, taken in connexion with a multitude of unsystematic and unrecorded observations, it appeared quite conclusive, at least to my mind. However, in order further to elucidate the subject, and render the evidence still more complete, I determined to avail myself of the first suitable opportunity to prosecute systematic observations extending over a period much longer than that of any of the cases recorded in my previous Report, and, seeing that the periodicity is one of 24 hours, I thought it possible that it might in some way be influenced, or even caused, by the more or less regular diurnal fluctuations in meteorological conditions dependent on the daily revolution of the earth, or, possibly, that the normal daily rise and fall of body temperature, or other quotidian physiological phenomenon, might have some association with it. I determined, therefore, to add to my observation on the ingress and egress

* See *Customs Medical Reports*, xiii, 30, xiv, 1, xviii, 31, xx, 13

† *Ibid*, xviii, 36

of the embryo parasites others on the temperature and pressure of the atmosphere, the temperature of the body, and the rapidity of the circulation, as indicated by the state of the pulse

I was able during the summer of 1880 to enlist the services of two sufficiently intelligent lads, in every way well suited for my purpose. I trained them to examine the blood, to count the embryo parasites they found therein, to read the thermometers and barometer, and to record all their observations accurately. As they themselves were filarious, and the subject of their own observations, the work could be prosecuted easily, with little fear of interruption, and with the sympathies of the observers entirely on the side of accuracy and truth. Their work I constantly superintended and checked. If error has crept into the chart* into which I have condensed their observations, I am certain it is of a trifling and unimportant character, such as is necessarily inseparable from work of the kind, taken as a whole, it may be thoroughly relied on.

Both lads came from Hooihoah, a highly filarious district, about three days' journey to the north of Amoy. LI KHA (I in the chart) was 21 years of age, of average size, and in good general health. He gave no history of fever, lymphangitis, or of any serious disease whatever, and his body appeared to be free from blemish that might be associated with the presence of filariæ. TRONG SENG (II in the chart), on the contrary, gave a history that distinctly pointed to filarial infection. He, too, was 21 years of age and in good general condition, but he stated that for six or seven years he had been subject to attacks of what he called ague (lymphatic fever), and that these attacks recurred about once a month. They began, he said, with a feeling of giddiness, and painful aching weariness in the body and limbs. This gradually merged into a cold stage of two or three hours' duration, which was succeeded by a hot stage of very high fever, lasting for 24 hours, terminating in a moderate diaphoresis, continuing for an hour or two. The fever was accompanied by complete anorexia, and during its continuance the inguinal and femoral glands invariably became swollen and excessively painful, those on the right side being more affected than those on the left. With the exception of these attacks and an orchitis which developed while under observation, and to be presently alluded to, he never had any trouble about the limbs or genitals, nor other symptom of filarial disease.

The observations by and on these two men I condensed and arranged in the chart previously published. In explanation of it I may mention that the first three compartments, counting from above downwards, refer to LI KHA (I), the second three to TRONG SENG (II), and that the two lowest are occupied by readings of the barometer and ordinary thermometer. At the left hand margin are numbers referring to the filariæ found in a droplet of blood obtained by pricking the finger, and sufficient to occupy in a thin transparent film a slide measuring $1'' \times 1\frac{1}{2}''$, also the degrees of temperature of the body, beats of the pulse per minute, temperature of the atmosphere, and barometric pressure. Along the top the figures refer to the date and hour of the day at which the examinations were made.

This chart, recording as it does a long series of systematic and carefully made observations, establishes thoroughly my first assertions about filarial periodicity. A glance at it shows with what regularity every evening the embryos enter the general circulation, how they increase in number up to midnight, and how, as morning approaches, they gradually diminish until

* This chart was published in *Customs Medical Reports*, xxii, 64

they completely disappear. Rarely can one be found from 9 A.M. until 6 P.M., at least under ordinary circumstances. Since these observations were made I have had the satisfaction of seeing them confirmed by several observers, notably by Dr MYERS in Formosa,* and by Dr STEPHEN MACKENZIE in London†. Drs RENNIE and ADAMS of Foochow, I understand, can also confirm my statements, and I doubt not that by this time filarial periodicity has been amply demonstrated by other observers in the different countries in which the parasite is endemic.

It is a remarkable phenomenon, and now that its existence is so well established I would commend it to the physiologist as a possible aid to the explanation of such rhythmical phenomena as sleep, the evening rise of body temperature, etc., to the pathologist as a possible aid towards the explanation of diurnal intermission and remission in fevers, especially of the ague class. Whether it may or may not be of service in either of these directions it is impossible as yet to say. But though it may lead to nothing in this way, yet the thing itself is so curious and of so striking a character that the mind naturally desires more information about it, and, if possible, an explanation of its object and of its cause.

I have already pointed out‡ that filarial periodicity is an adaptation of the habits of the filaria to those of the mosquito, the intermediary host indispensable to the future life of the parasite. This is the object of the arrangement, but the particular force or mechanism that operates on the embryo parasite, causing it to appear in the blood normally only at certain hours,—this, the cause of filarial periodicity, has yet to be ascertained. Certain facts, however, have recently been discovered that tend to confine the search to a comparatively limited field.

From the fact that the periodicity is one of 24 hours, we are justified in inferring that its remote cause is the diurnal revolution of the earth. As affecting the parasite in the human body, this may operate in one of two ways: 1st, by means of some of the daily and rhythmical variations it produces in meteorological forces—one or other of these being the direct determining influence that liberates or restrains the parasite, or, 2nd, by inducing in the host of the parasite certain quotidian and rhythmical habits on which, directly or indirectly, the movements of the hæmatozoon depend,—such as the habits of waking and sleeping, exercise, the evening rise of body temperature, the times of feeding, etc. With regard to the first of these, there are at least four principal meteorological phenomena which have a more or less quotidian and rhythmical character, and which one might conceive had an influence in some way on the parasite. These phenomena are—the rise of atmospheric temperature during the day and fall during the night, the decrease of atmospheric pressure during the afternoon, the coming and going of the light, and the diurnal variations in the electrical condition of the earth, as indicated by the magnetic needle. But if we inquire into the behaviour of any of these, we shall find that no one of them is so absolutely true in its rhythm as is filarial periodicity. There are frequent exceptions to the general rules that the day is warmer than the night, and that barometric pressure falls during the afternoon. If either of these things, therefore, had anything to do with filarial periodicity, then we should expect to find the latter in entire sympathy with one or other of them, and exhibiting corresponding variations. But if the chart in which these are carefully noted is consulted, it can be seen at a glance

* *Customs Medical Reports*, xxi, 7

‡ *Customs Medical Reports*, xiii, 39

† *Lancet*, 1881, ii, 398, 707

how far this is from being the case. The presumption is, therefore, that filarial periodicity is independent of atmospheric pressure and temperature.

To ascertain if the waxing and waning of the light had any influence, I had a filarious subject, in whom I had previously ascertained that periodicity was normal, shut up for several days in a dark room, into which it was impossible for a single ray of sunlight to penetrate. During four days, as far as sunlight was concerned, he was always in the dark, and it was only after sunset that he left his room. A glance at the following table shows that the result of this experiment was entirely negative. I may remark that I was careful not to interfere with his usual habits, and therefore did not disturb him during the night to examine his blood. It was sufficient for my purpose to ascertain approximately the hours of ingress and egress of the embryos, and then conduct during the day.

TABLE showing the NUMBER of EMBRYO FILARIE, at the HOURS and DATES indicated, in a SLIDE of BLOOD $1'' \times 1\frac{1}{2}''$, the SUBJECT of OBSERVATION being kept in a DARK ROOM during the Four Days, 26th, 27th, 28th, and 29th November

Hour	Nov 24	Nov 25	Nov 26 *	Nov 27 *	Nov 28 *	Nov 29 *	Nov 30	Nov 31	DEC 1	DEC 2
7 A.M.	1	4	13	39	25	19	17	16	12	14
11 "	0	0	1	0	1	0	1	0	0	0
4 P.M.	0	0	1	0	2	0	3	1	2	0
7 "	5	0	0	0	1	0	5	1	4	0
9 "	10	8	5	18	10	7	17	18	27	16

Thus, of the meteorological influences which might be supposed to have an influence on filarial periodicity, three are eliminated. It has been shown that neither temperature, atmospheric pressure, nor light has anything to do with it. There remains only terrestrial magnetism, but although the rhythm of its variations corresponds very closely with that of filarial periodicity, the progress of discovery within the last few months has rendered a connexion between the two so extremely improbable that I have not considered it worth while to pursue investigation in this direction any longer. It has been pretty conclusively demonstrated that the immediate cause of filarial periodicity is dependent, not on meteorological conditions resulting from the daily revolution of the earth, but on the *habits* this great fact impresses on the human body.

In the *Lancet* of 27th August 1881 there appeared a letter from Dr STEPHEN MACKENZIE, in which he announced that a case of chyluria of Indian origin had turned up at the London Hospital, and that the filaria sanguinis hominis could be found in abundance in the patient's blood, and, further, that the same periodicity was observed by the parasites in London as had been described as occurring in China. At the meeting of the Pathological Society on the 18th October, Dr MACKENZIE exhibited this patient and demonstrated the parasites in his blood, and he also described how he had been able to break up, and even invert periodicity, by simply changing the habits of the patient with regard to the times of sleeping and waking.

* In dark room

DATE
4
Hour
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
DATE
Hour
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

If the patient slept during the day and kept awake during the night, periodicity was inverted. This was a new and important fact. It seemed to be another step towards the explanation of a curious phenomenon, and, impressed by its importance, I took an early opportunity to repeat and vary Dr MACKENZIE's experiments.

The history of the first patient on whom I experimented is briefly as follows —

Case 58 *Filaria in the Blood, Enlarged Spleen, Anæmia Experiment on Inversion of Filarial Periodicity*—TIN, male, æt 25, Tsongkhæ, Tchongtchin, a field labourer. When 12 or 13 years old, he says he had an abscess in his lungs, which burst, the contents escaping by his mouth. He spat over a bowlful of blood and pus at the outset, and continued afterwards for about four months to cough up similar stuff. He says the matter expectorated was thick, viscid, and could be drawn out in a long string, the discharge of this was difficult, attended with much cough, says he recollects this very well, as his mother used to slap his back to encourage expectoration. Now he has no trouble about his lungs beyond a slight cough when he catches cold. At 15 or 16, had for four months an eczema on both legs, and at 17 a very large abscess in the right popliteal space. Since boyhood has been subject every autumn to aguish attacks of a very irregular character, lasting off and on for about a month every year. Often during these attacks the inguinal glands, sometimes on the right side, sometimes on the left side, inflame, but neither pain nor swelling is ever considerable. Occasionally his right testicle enlarges without inflammation. These attacks of fever consist of about one hour of rigor, followed by three hours of heat and one hour of sweating, often they are distinctly tertian, and I think they are genuine ague. The swelling of the glands does not always accompany the fever, but the lymphangitis is usually associated with fever.

He states that some years ago I removed big scrota from two men living in his village, but he does not know of any well-marked case of elephantiasis of the leg among his neighbours. When young, he often drank cold water, but since he became sick he never touches it.

He is very thin, anæmic and debilitated. An enlarged spleen extends beyond the border of the ribs. He has no decided enlargement of glands, scrotum or legs, nor does he give any history of chyluria.

This year his ague began about two months ago. It was tertian in type, and continued on him in a subdued form for about a month. He came to hospital to be treated for his debility, enlarged spleen and dyspepsia. He took quinine and BLAND's pills for a fortnight, and when his health had improved considerably I got his consent to experiment on his blood parasites.

From the 9th to the 26th December 1881, observations were regularly made on this man, the usual quantity of blood (1" × 1½" cover glass) being examined each time. During the first five days sleep was indulged in at the usual hours. Periodicity having been found normal, the time of sleep was changed to the day, and of waking to the night. On the 14th December he was not allowed to sleep as usual, but was kept awake till 6 in the morning of the 15th—that is, for 24 hours. He was then allowed to sleep till afternoon, and from this time sleep was always indulged in during the day, while at night he was kept awake. Simultaneously with observations on the number of filariae present in a given quantity of blood, observations on the body temperature were made, in order to avoid the complicating effect of fever should this occur, but as the temperature kept normal all the time, I have not considered it necessary to introduce its record into the chart (I, facing this page,) on which I have condensed my observations. In explanation, I may mention that the figures at the side refer to the number of filariae in a slide of blood 1" × 1½", while the figures along the top refer to the date and hour of examination. For the first five days the sleeping hours were

from 6 P M to 6 A M On the subsequent days—that is, from the 15th to the 24th December—they were from 5 A M to 5 P M During the period when the patient slept at night I did not consider it necessary to wake him at midnight to sample his blood, so in the chart I have assumed that at this hour on these days the filariæ numbered 100 With this exception, only carefully observed facts are recorded

It is evident from this chart that Dr MACKENZIE's case was not exceptional, it confirms his statement as to the connexion of the sleeping and waking states with filarial periodicity Something bound up with these states has clearly a powerful influence on the parasite or its young But, as Dr MORTIMER GRANVILLE points out,* it is not simply sleep or waking that has this influence It is something recurring every 24 hours, just as the habits of sleeping and waking recur, and which is capable of being inverted just as these habits are, and by the same means That sleep does not cause the ingress of embryos is evident from the circumstance that ingress commences hours before the usual time for sleeping, and egress begins hours before the usual time of waking, and periodicity is maintained even though no sleep be indulged in for two or three days, or if sleep is continuous, or nearly so, for as long a time (see Charts II and III) The facts of the case seem to indicate that the conditions favourable to the ingress of the parasites become developed ordinarily during the last few hours of the waking state, and that they are slowly eliminated during the last few hours of sleep

Being anxious to vary Dr MACKENZIE's experiment, and, if possible, obtain additional facts that might aid in answering the question of the cause of filarial periodicity, I placed two other men under observation, and variously altered and modified their hours of sleeping, waking and eating Unfortunately, the man TIN, who was the subject of the observations recorded in Chart I, had had enough of it, and seemed very reluctant to submit to a second course of experiment I was therefore obliged to fall back on the two other men, whose stock of filariæ was rather too limited to show distinctly delicacies of fluctuation I give the results for what they are worth Charts II and III are arranged on the same plan as Chart I The letter "F" is introduced at the hours when food was taken

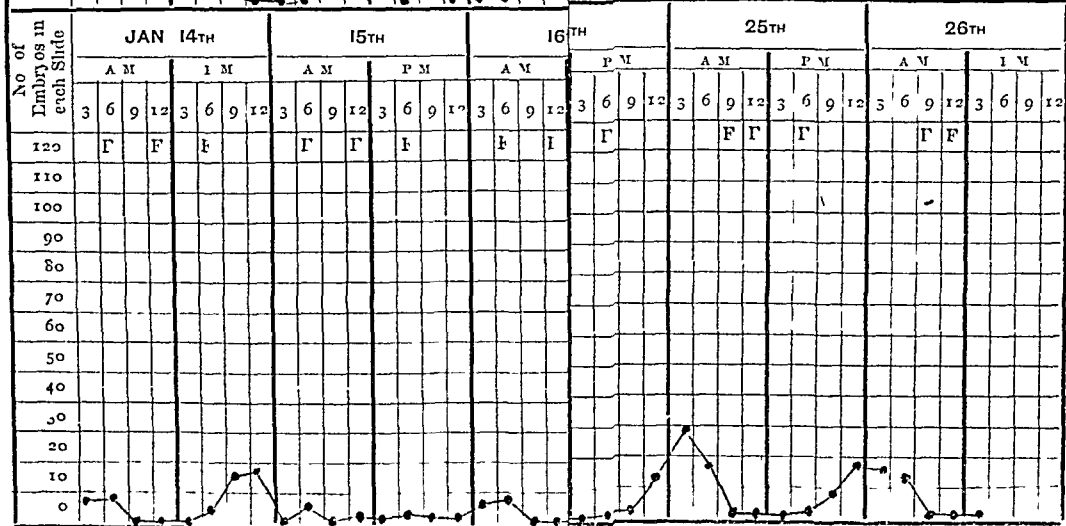
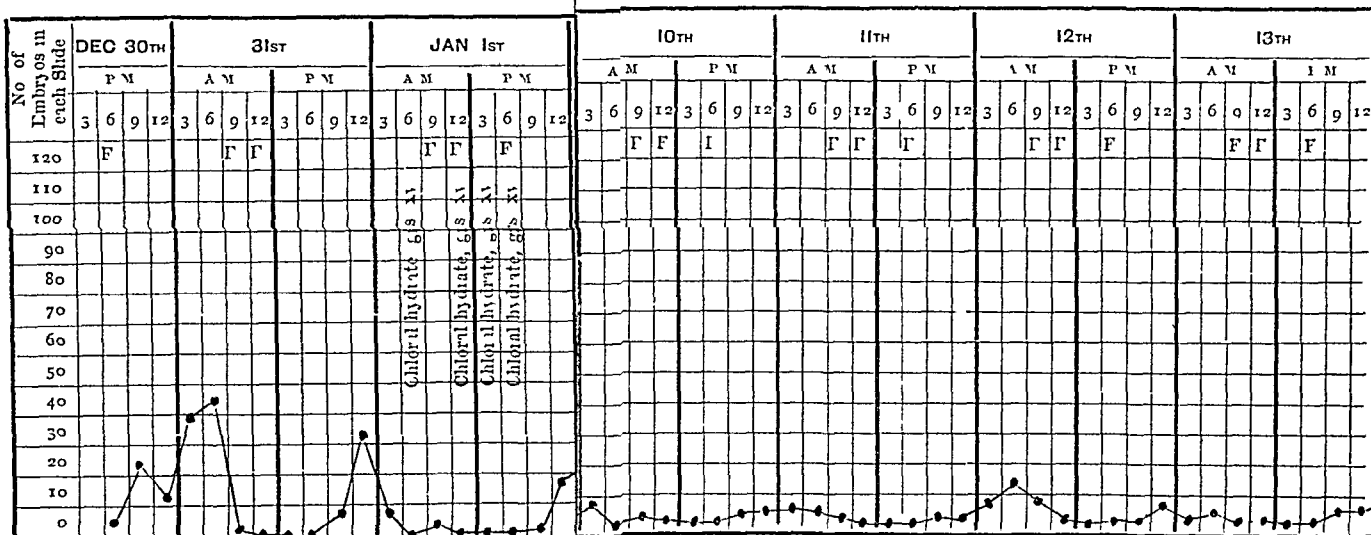
In the case of TIEK Po (Chart II), the patient slept from 9 P M on the 30th December to 6 A M on the 31st From 9 P M on the 31st December to 6 A M on the 3rd January, and from 3 P M on that day to 3 P M on the 5th, sleep was prolonged by repeated doses of chloral, the patient being waked up to take food at the usual hours From the 5th to the 8th January the sleeping hours were from 9 P M to 6 A M Thence until the 20th, sleep was allowed each day from 8 A M to noon, and from 8 P M to midnight On the 20th–21st the patient slept from 8 P M to 6 A M, and on the subsequent nights from 9 P M to 6 A M

In the case of IN (Chart III), sleep was permitted from 9 P M on the 30th December to 6 A M on the 31st The waking state was enforced from this latter hour until 9 P M on the 2nd January Thence to the 18th January sleep was enjoyed nightly from 9 P M to 6 A M, and from 9 P M on the 18th to noon on the 19th

The history of the men is briefly as follows —

Case 59 TIEK Po (Chart II), male, æt 25, Tchauoi, Tchiupo, farmer He lives in a village of about 150 inhabitants, and among these are several cases of elephantiasis Has been ailing for four or five years with ague of tertian type Off and on has had attacks every winter with the advent of the

* *Lancet*, 1882, 1, 314



cold weather His spleen has been enlarged for several years, and since a year ago he has been subject to attacks of pain and swelling in the left testicle and cord

On examination his spleen is found to extend to the umbilicus, but no swelling of cord, testicles, scrotum, glands nor legs can be made out, nor is there any history of chyluria or lymphatic fever Two months ago he had a single fit of fever, and is now very anæmic

During the time he was under observation he was given quinine and non in full doses

Case 60 IN (Chart III), male, æt 47, Danmng, Tchiupo, farmer In his village of 200 inhabitants are several cases of elephantiasis of leg or scrotum One of the latter was operated on at the hospital some time ago Since boyhood has been subject nearly every year to lymphatic fever of three or four days' duration, associated with swelling of the testicles and scrotum He has also had attacks of tertian ague and swollen spleen, but at present, both spleen and scrotum are normal to all appearance, although the groin glands are rather large and firm He says that during his fever attacks these glands swell to the size of fowls' eggs Had, on admission, right facial paralysis of 40 days' standing, this supervened during an attack of fever and delirium Has never had chyluria nor distinct sign of elephantiasis His reason for coming to hospital was to be cured of a long-standing chronic ulcer on the left leg He, too, while under observation, took full doses of non and quinine

From these charts we may gather that filarial periodicity is maintained during prolonged watching, and also when the hours of eating are changed, so that the middle meal is taken at midnight, and not, as usual, at mid-day, also, that prolonged sleep possibly disturbs periodicity and diminishes the number of parasites circulating at the time of maximum, and, that when the usual allowance of eight hours' sleep is taken in spells of four hours at a time, at intervals of eight hours, periodicity is disturbed, and the numbers circulating at the time of maximum are sensibly diminished

When experiments and facts have been multiplied, we may be able to say precisely what is the cause of filarial periodicity At present, facts are wanting One which seems to me to have some importance I have not yet alluded to If reference be made to the chart at p 64 of vol xxii, it will be seen that the man TRONG SENG was, shortly after observation commenced, attacked with fever The fever was consequent on orchitis and lymphangitis, undoubtedly of filarious origin It will be seen that the body heat was very high a considerable time before periodicity was affected, and that the usual rhythm of the ingress and egress of the parasites was not renewed for some days after the temperature had fallen to normal It would seem that the febrile condition slowly developed in the blood, or elsewhere, some constituent or condition whose presence or amount influenced the parasites, and that it was not until this pathological product or condition was eliminated or altered that periodicity of a normal character was resumed May not the waking state, which seems so favourable to the ingress of the parasites, be associated with the development of some physiological condition or product analogous to, or the same as, that resulting in pathological quantity from fever, and the presence of which leads to the presence of the embryo parasites in the blood?

Dr MACKENZIE'S discovery has done something to advance this interesting inquiry He has limited the field in which search need be made Nevertheless, much has yet to be done, more facts to be collected, before the answer can be given It seems to me that this will have to be supplied by the physiologist, and when the answer has been supplied, we shall be in possession of an explanation of many phenomena more important, though not more curious, than filarial periodicity

FATE OF THE EMBRYO PARASITES NOT REMOVED FROM THE BLOOD

Another point on which I have a few remarks and facts to offer has recently been discussed by Dr MYERS in a valuable paper in the 21st volume of these Reports, viz, the fate of the embryo parasites which have not been directly removed from the blood by mosquitos or other means. Do they, after a brief life of a few hours, die, and have we to deal with a fresh swarm every 24 hours? Or do the parasites, after a temporary appearance in the general circulation, daily retire to some organ or set of vessels to await the recurrence of conditions such as I have been discussing, which induce them again to circulate? Dr MYERS alleges that when the blood is examined towards morning, when the numbers are diminishing, symptoms of languor are observable in many specimens, and if these languid individuals are watched for some days they are found to disintegrate more rapidly than other and more vigorous specimens obtained during the earlier part of the night. Dr MYERS's experiments I repeated many times, but failed to satisfy myself that what he describes applied to the parasites I observed. I have kept both morning and evening embryos alive on oiled slides for over 100 hours. In fact, so long as the serum of the blood remained fluid or viscid, so long did the parasites live. I do not think it reasonable to suppose that animalcules exhibiting such tenacity of life outside the body should so quickly die in it, seeing that the circulating blood is their natural habitat. But, even supposing that what Dr MYERS describes is to be found in every case, it does not by any means follow that this condition of languor is preliminary to disintegration, quite as probably it is preliminary to their passing into some state of rest. If they died daily in the blood, surely dead specimens would be frequently met with, yet so far is this from being the case that I do not recollect ever to have seen in freshly-drawn blood a dead filaria—at least, one whose death could not easily be accounted for by crushing under the cover glass. The facts Dr MYERS adduces are hardly sufficient to found an argument on. In a former paper * I quoted some experiments on the destiny of the embryos of filaria immitis of the dog. Their preponderating abundance in the lungs at certain times seemed to favour the supposition that they occasionally retired to the pulmonary circulation, and I suggested that something analogous might happen in the case of filaria sanguinis hominis. I quite agree with Dr MYERS that such evidence is not conclusive, but analogy must be allowed to have some weight in inquiries of this nature. I may mention here that blood aspirated from the enlarged spleens of two filarious patients during the day contained no filariæ, and that examination of a very small quantity of lung blood in a case of hæmoptysis, also in a filarious subject, yielded similarly negative results.

If we adopt Dr MYERS's views as to the fate of the embryos, we are driven to the conclusion that filarial periodicity depends on intermittent reproduction, and that a fresh swarm issues from the parent every 24 hours. It is possible to put this hypothesis to the test of experiment. In two cases I have had the opportunity of doing so.

I have already† published a case of lymph scrotum in which the parent filaria was found. Prior to operation lymph constantly dripped from ruptured lymphatics on the surface of the scrotum. As there was constant discharge, there was no accumulation. Therefore the

* Customs Medical Reports, viii, 40

† *Ibid*, xx, 13

lymph that escaped was a fair sample of what was passing the parent worm, and in which she was lying. The lymph was examined three times in one day, viz, at 11 A.M., 5 P.M., and 7 P.M. At each examination many embryos were found. It was evident that the parent was giving birth to them at a time when they are normally absent from the circulation, and that periodicity in this case was independent of the act of parturition. Did filarial periodicity depend on intermittent reproduction, then no embryos could have been found at 11 A.M., and if found at 5 P.M. they would have been present in the lymph only in very small numbers. I might have made a more extended and careful series of examinations in this case with a view to settle the point, but its importance did not occur to me at the time. Still, as far as they go, these few observations are significant.

Since Dr MYERS informed me of his views, I have been on the outlook for a similar or equally suitable case, and some time ago succeeded in finding one which seems to me to settle the point.

Case 61 *Chyluria, Filariæ in the Blood and Urine an Attempt to ascertain whether Filarial Periodicity be dependent on Quotidian and Intermitting Reproduction, or whether it be altogether independent of the act of Parturition*—IP, male, æt 24, born and residing in Hongkong, a large village on the North River, about 8 po from Amoy, farmer. Never suffered from fever, nor, until lately, from any serious disease. Sometimes his dyspeptic pains in the belly, but nothing of a more serious character. For the past seven or eight years has been troubled with swelling of the left testicle after a hard day's work, the swelling is only slight, and is never accompanied by fever or inflammation.

The chyluria, on account of which he came to hospital, appeared about 60 days before the date of his admission. It began suddenly after a long, rough, midnight hunt after wild pig on the Hongsin Hills. On his return home he urinated clots, and since then he has constantly, with only one or two exceptions, passed chylous urine. Latterly, he says, the urine has become redder in colour, formerly it was more milky.

He has no elephantiasis nor disease of legs, scrotum or glands, the only thing amiss is slight swelling of the left testicle. Elephantiasis is not common in his village, but there are plenty of cases in the surrounding country. He often drinks cold water.

The urine on being passed is of a dark opaque salmon colour, and reddish clots swim in it. Examined with the microscope it is found to contain many active filariæ, and his blood, if serached after sunset, is seen to be similarly infested.

He complains of much debility and considerable loss of flesh and strength, but his appetite is as good as ever.

As in this case lymph or chyle was nearly always present in the urine, there could be no accumulation in the lymphatics. What at any given time might be selected for examination was a fair specimen of that passing the parent worm, and the presence or absence of embryos in this would be a reliable indication of her activity or repose as regards the act of parturition. It was therefore a case well suited to settle the question whether filarial reproduction was a more or less constant or an intermitting process.

The patient was given a placebo, and directed to pass urine into a clean vessel every three hours. The urine thus obtained was well stirred, so as to break up coagula as soon as they formed. An ounce of it was then drawn off into a smaller vessel, and allowed to stand for some hours until subsidence had occurred. A little of the sediment was then taken up with a pipette, one drop of this placed on a suitable slide, and the filariæ it contained carefully counted. Blood drawn at corresponding hours was also examined, and the number of embryos in a slide 1" x 1½" enumerated. The result of these examinations, extending over one week, I have projected in the accompanying table.

TABLE showing the NUMBER of EMBRYO FILARIÆ in a fixed Quantity of BLOOD and URINE, obtained at intervals of Three Hours, from a case of CHYLURIA *

1881		HOURS							
		3 A M	6 A M	9 A M	12 M	3 P M	6 P M	9 P M	12 M D N
August 13	{ Quantity of urine Filarie in urine " blood				12 4 0	$\frac{1}{2}$ 1 0	10 10 0	8 2 4	12 0 1
" 14	{ Quantity of urine Filarie in urine " blood	W $1\frac{1}{2}$ 0 0	1 4 0	5 0 0	$5\frac{1}{2}$ 9 0	10 1 0	W 15 0 1	11 1 6	W 8 0 8
" 15	{ Quantity of urine Filarie in urine " blood	W 4 2 2	$2\frac{1}{2}$ 3 0	$\frac{1}{2}$ 8 0	6 17 0	10 2 0	17 0 0	$16\frac{1}{2}$ 11 12	6 0 14
" 16	{ Quantity of urine Filarie in urine " blood	$5\frac{1}{2}$ 1 3	W $2\frac{1}{2}$ 0 0	$\frac{1}{4}$ 2 0	$17\frac{1}{2}$ 6 0	20 3 0	W 22 0 0	$18\frac{1}{2}$ 2 17	13 1 11
" 17	{ Quantity of urine Filarie in urine " blood	W $2\frac{1}{2}$ 1 2	W 2 0 0	1 2 0	6 6 0	18 6 0	15 2 0	6 11 9	5 2 7
" 18	{ Quantity of urine Filarie in urine " blood	W 8 0 1	W 2 0 0	3 1 0	W 8 1 0	$16\frac{1}{2}$ 11 0	11 14 0	$18\frac{1}{2}$ 1 14	12 0 9
" 19	{ Quantity of urine Filarie in urine " blood	$3\frac{1}{2}$ 0 2	$4\frac{1}{2}$ 0 0	1 23 0					

If these figures are added together and arranged as follows, the results of this examination become more apparent. It seems to me that they indicate that filariæ embryos are nearly constantly passed into the lymph stream, and that whenever lymph finds its way into the urine, no matter at what hour, nor how long it has been running, it contains the parasite. Therefore, filarial periodicity is independent of the act of parturition, which is more or less a continuous process.

PRÉCIS of foregoing TABLE

	HOURS							
	3 A M	6 A M	9 A M	12 M	3 P M	6 P M	9 P M	12 M D N
Total quantity of urine in ounces	25	$14\frac{1}{2}$	11	55	75	90	$78\frac{1}{2}$	56
" filariæ in a slide of urine	4	7	36	43	24	26	28	3
" " " blood	10	0	0	0	0	1	62	50
Average quantity of urine	$4\frac{1}{5}$	$2\frac{2}{5}$	$1\frac{5}{6}$	$9\frac{1}{6}$	$12\frac{5}{6}$	15	13	$9\frac{2}{3}$
" filariæ in a slide of urine	$\frac{4}{5}$	$1\frac{1}{6}$	6	$7\frac{1}{6}$	4	$4\frac{2}{3}$	$4\frac{4}{6}$	$\frac{7}{6}$
" " " blood	$1\frac{2}{3}$	0	0	0	0	$\frac{1}{6}$	$10\frac{2}{3}$	$8\frac{1}{6}$
Number of times urine watery	4	3	0	1	0	2	0	1

* W before the amount of urine indicates that it was watery and comparatively free from chyle or lymph. The quantity of urine is expressed in ounces.

Although not bearing specially on the subject under discussion, the history of the case after this series of observations was completed is of interest as showing how much mechanical influences have to do in setting up and maintaining elephantoid diseases

The observations recorded in these tables were completed on the 19th of August. On the 20th I sent him to bed and confined him strictly to the recumbent position. Very shortly this had the effect of making the urine in most specimens perfectly limpid. By the end of a week it was permanently clear. He then went home. Six months afterwards I heard of him. He was then quite well, and said he had not passed chylous urine since he left the hospital.

The chyluria was caused in the first instance by the succession of rough exercise rupturing a congested and dilated lymphatic in the urinary tract, rest, and the removal of lymph pressure, obtained by maintaining the recumbent position, allowed the rupture to heal. The chyluria was thus cured, at least, temporarily, and one element in the pathology of these diseases clearly indicated. Chyluria, lymph scrotum, elephantiasis, diseases caused by lymphatic congestion and varicosity, should be treated on exactly the same principles as diseases resulting from mechanical blood congestion or venous varicosity. The most important element in the treatment of both forms of congestion is the removal, as far as possible, of fluid pressure by rest and elevation of the affected part.

THE INTIMATE PATHOLOGY OF FILARIA DISEASE

There is abundant evidence that *filaria sanguinis hominis* does not always, or even generally, give rise to disease. As a rule, parasite and host live together for years in perfect harmony. Nature has adapted the requirements of the former to the organisation of the latter. But the evidence is equally strong that at times this harmony is disturbed, and that the presence of the parasite entails grave disease to its host, and that this disease is sometimes in one organ, sometimes in another. These are circumstances which demand an explanation. Why should the parasite give rise to disease in one man and not in another, and why should one organ suffer in one subject, another organ in a second, another in a third, and so on?

The explanation I propose to supply. I have some diffidence in bringing it forward, for it is of so strange a character, and unlike anything in pathology, that I fear many will disbelieve my facts and ridicule my conclusions. Nevertheless, the facts are correct, and this being the case, I do not see how the conclusions I deduce from them can be avoided. Many years may elapse before my observations are confirmed, for hundreds of cases may have to be examined before one similar to those I will refer to is encountered, and even when this has been met with and described, I barely hope that, unless it is vouched for by some very eminent authority, it will carry conviction to all minds. The facts of parasiticism are as strange as they are important, and just in proportion to this is the difficulty in getting them believed.

Some time ago* I gave the particulars of a case of lymphatic œdema of the legs, associated with slight enlargement of the groin glands. I described how I punctured the glands with a hypodermic syringe, and how I found in lymph thus obtained not only the

* *Customs Medical Reports*, xviii, 49

usual form of embryo filaria sanguinis hominis, as seen in the lymph and blood, but ova of the parasite containing active and perfect embryos. This for a long time remained an isolated and, by me, misinterpreted fact. To account for the presence of the ova I supposed that the parent filaria was normally oviparous, and some ambiguity in LEWIS's description of the worm gave ground for this. But afterwards I had the good fortune to find two specimens of the mature worm for myself. An examination of these convinced me that they were certainly viviparous, and that my former hypothesis was therefore incorrect. How, then, seeing that the animal was not oviparous, was I to account for the presence of the ova in the case I refer to? I searched the gland lymph of dozens of cases, and also the lymph from many lymph scrota, and several cases of chyluria, but in vain. I could not meet with ova a second time. I began, therefore, to think, improbable though the supposition seemed, that the hypodermic needle I used to extract the lymph had wounded the uterus of the parent worm, and thus allowed the ova to escape. But in the spring of last year a second case turned up in which ova were found, and under circumstances in which it was impossible to suppose their presence was owing to injury of the parent. The following are my notes of the case —

Case 62 *Lymph Scrotum, Filaria in Lymph from Scrotum, also Ova containing coiled-up and active Embryos, small number of Parasites in the Blood* Operation—TUI, male, æt 50, Tchongtchiu, Kluantan, a farmer. There are some 200 to 300 inhabitants in his village, including several cases of elephantiasis. One, called BENGGA, I operated on some years ago, removing a 12-lb scrotum.

When young, was careless about the water he drank, taking it indiscriminately from pool, well or river. When a little over 10 years of age, had frequent attacks of ague, both quotidian and tertian. His scrotal trouble began at 18. He had hydrocele then, and at times inflammation of the scrotum, and lymphous discharges. Two years ago, he says, I tapped his hydrocele. I forget the circumstance, and the character of the fluid withdrawn. As I did not inject iodine, doubtless at the time I considered the hydrocele to be of filurious origin, although he says the fluid removed was clear and straw coloured. The hydrocele did not return, but the scrotum enlarged. He has attacks of fever and enlargement of the groin glands, and, irregularly, some three to ten times a month, the scrotum discharges a clear fluid, very like urine in appearance.

18th May 1881.—The scrotum is as large as a pumpkin, and the penis is buried in it, the upper and anterior part is firm like a forming elephantiasis, while the lower and back part is covered with enormously dilated lymphatics, some of the ampullæ containing clear fluid being as large as the tip of a finger.

7 P.M.—Picked a vesicle, profuse discharge of fluid, in which I found filariæ. A slide of blood from the finger drawn at 9 P.M. contained no parasites.

19th May, 6 A.M.—Slide of finger-blood examined, no filariæ. Lymph drawn last night again examined, it had coagulated but feebly, it again yielded filariæ. The feeble coagulum was now broken up by stirring. It rapidly disappeared, a small quantity of red deposit and some white cloudy flocculi subsiding. In this sediment were many embryos, and in nearly every slide ova, with active embryos struggling vigorously to stretch their chorionic envelopes. No double outline could be detected in the embryos. The chorion could be distinctly made out, especially when the activity of movement had somewhat subsided.

20th May.—An assistant examined a large slide of blood drawn at 10 P.M. last night, and in it found one embryo, and again at 6 A.M. to day, but then found none. I examined several slides of sediment from the lymph of the 18th, and found embryos still alive, many of them enclosed in an oval or nearly

globular sac, and two specimens in which the chorion was half stretched. These latter embryos were still working vigorously, but had not quite completed the stretching operation, as a third of either anterior or posterior end was still doubled on the rest of the body, no room having as yet been gained for the animal to be completely outstretched.*

In this man a very few embryos still found their way into the circulation, but there certainly was no free communication between the lymphatics of the scrotum and the blood.

21st May.—Scrotum removed, skin of penis being preserved. I quite expected to find the parent worm in this case, but although the scrotum was cut up into very small pieces and carefully searched, no trace of the animal was observed. The tissues were much more dense than is usual in lymph scrotum, and their bulk was considerably greater than obtains in the generality of these cases. In fact it appeared, but for the vesicles and discharge, more like an ordinary case of elephantiasis. No lymph could be made to regurgitate by pressure on the groin glands.

10th June.—Case doing well. Since the operation the blood was frequently examined, and at suitable times, but no filariæ were found in it.

Here, then, are two cases in which the ova of the parasite were found in the lymphatics. It is evident that my first case was not exceptional. Occasionally, ova *are* passed into the lymphatics. Like other animals, therefore, the parent filaria is liable to miscarry. This, at first sight, would appear to be a matter of little importance, but reflection will show that this is by no means the case. The accident is fraught with danger, and is in fact the cause of the elephantoid diseases, and the key to their intimate pathology.

In the instances in which the parent worm has been discovered she was found in lymphatic vessels on the distal side of the glands. This has been shown to be in many, if not in all, cases her normal habitat. Her progeny, therefore, must travel along the afferent vessels, through the glands, and so on to the thoracic duct, and thence into the blood. The long, sinuous, and powerful body of the embryo is well adapted to perform this journey. But suppose, instead of this mature embryo, an ovum is launched into the lymph stream prematurely, and before the contained embryo has sufficiently extended its chorion, then this passive ovum must certainly be arrested at the first lymphatic gland to which it is carried by the advancing lymph current. It measures $\frac{7}{100}$ " \times $\frac{1}{500}$ ", whereas the outstretched embryo is only about $\frac{1}{3000}$ " in diameter. It is much too large to pass the glands, and the embryo, rolled up in its chorional envelope, cannot aid itself. It becomes, in fact, an embolus. Now filariæ are prodigiously prolific. Myriads of young are expelled in a very short time. I have watched the process of parturition in the minute filaria *corvicoluati*. Every few seconds a peristaltic contraction, beginning low down in the uterine horns and extending to the vagina, expels some 20 or 30 embryos. If this process of parturition occurs prematurely, or peristalsis is too vigorous, and extends to a point high up in the uterine horns where the embryo has not yet completely stretched its chorional envelope, then ova are expelled. These, as they reach the glands, where the afferent lymphatic breaks up into fine capillary vessels, act as emboli, and plug up the lymph channels one after another until the fluid that carries them can no longer pass. In this way the gland or glands directly

* For a description of the process of chorion stretching here alluded to, the reader is referred to the *Customs Medical Reports*, xiii, 31, and xiv, 11.

connected with the lymphatic in which the aborting female is lodged are thoroughly obstructed. Anastomoses for a time will aid the passage of lymph, but the anastomosing vessels will carry the embolic ova as well as the lymph. The corresponding glands will then, in their turn, be invaded, and so on until the entire lymphatic system connected directly or indirectly with the vessel in which the parent worm is lodged becomes obstructed.

This, I believe, is the true pathology of the elephantoid diseases: 1st, parent filaria in a distal lymphatic, 2nd, premature expulsion of ova, 3rd, embolism of lymphatic glands by ova, 4th, stasis of lymph, 5th, regurgitation of lymph and partial compensation by anastomoses, 6th, renewed or continued premature expulsion of ova, 7th, further embolism of glands. This process, according to the part of the lymphatic system it occurs in, the frequency of its recurrence, and its completeness, explains every variety of elephantoid disease.

It would be tedious to apply the theory in detail. One has but to locate in imagination an aborting female filaria in the different lymphatic areas, and follow out in his mind the effect of embolism of all or part of the lymphatic circle, in order to recognise the key to an entire group of diseases. If we bear in mind what must be the effect of injury, gravitation, diathesis, and so on, on the areas of lymphatic congestion, and do not overlook the circumstance that the lymphatics of one side of the body anastomose with those of the other, there is no fact or variety of filaria disease which this theory does not fully explain.

It may be objected that I have assumed too much in supposing that the parent worm is liable to miscarry. But I have sufficient evidence in the two cases I have narrated that it has occurred, and if it has happened twice in a limited number of cases, it certainly happens not unfrequently. Perhaps I have examined lymph from scrotum, glands or urine in 200 cases, yet, in this limited number of observations, evidence of premature birth of ova was obtained twice. Therefore the thing cannot be of very rare occurrence, although to have sampled the lymph at the proper time and in a suitable case must be regarded as a fortunate circumstance not often to be encountered. I trust that the theory I have propounded will not be condemned off-hand, but that observers will patiently work out the cases they meet, examining thoroughly the sediments of lymph from scrotum, glands or urine. If this be done by three or four conscientious workers with suitable opportunities, some one, before many years are over, will find the ova in the lymph just as I have done. With these before him, let him try to account for their presence, and attempt to follow out in imagination the effect of their passage along the lymphatic vessels. I feel sure he will arrive at the conclusions I have expressed, and that he will become a convert to the parasitic theory of elephantoid disease.

ABSCESS CAUSED BY DEATH OF PARENT FILARIA

The explanation I have given of the manner in which elephantoid disease is produced applies to most, if not to all, diseases, with one exception, which result from the presence of the parasite in the human body. There is one exception. *Death* of the parent parasite may give rise to abscess, and the frequency with which abscess of the scrotum or thigh is met

with in Chinese practice here is, in my opinion, attributable to this The following case was certainly of this nature —

Case 63 *Abscess in the Thigh caused by the Death of the Parent Filaria, Varicose Grown Glands, Fragments of mature Worm in the contents of Abscess*

7th January 1881 — A middle-aged, well-nourished man came to hospital to-day with a large, hard, blawny-red swelling in the upper and inner part of the right thigh. An abscess was evidently forming. I observed that the corresponding femoral glands were somewhat enlarged, softish, and not inflamed, and he said they had been swollen long before the present trouble began. He also had had fever, apparently lymphatic. Accordingly, I concluded that the glands were filarious, and that their enlargement was not secondary to the inflammation then existing. I drew off from them with a hypodermic syringe some milky lymph. In this a very imperfect and hurried search was made for embryos, but none were found. *Diagnosis* — Abscess caused by death of parent filaria in lymphatics. Pus, apparently, had not formed, so mercurial ointment was ordered to be rubbed into the swelling, and poultices to be applied.

10th January — Returned this morning in great pain, matter had formed. Free incision gave vent to about 4 ounces of dark yellow-brown pus, in which floated two or three dark clots of blood, evidently effused for some time. The pus and clots were all collected, and this evening I carefully searched them. By drawing a needle rapidly through the pus, I succeeded in entangling three or four fibres, which, on being subjected to microscopical examination, proved to be fragments of a mature female filaria. In one fragment were large numbers of fully-formed outstretched embryos, all dead and granular, great bunches of them escaping from rents in the wall of the uterus, other fragments were crowded with ova at an earlier stage of development. (See illustration.)



FRAGMENT OF FEMALE FILARIA SANGUINIS HOMINIS FROM ABSCESS IN THIGH, SHOWING REMAINS
OF ALIMENTARY CANAL, DECOMPOSING BODY, DEAD EMBRYOS ESCAPED
FROM RUPTURED UTERUS, ONE OVUM VISIBLE

25th January—Filariae have been found in this man's blood every night till date. To-night I found two active specimens in a slide of finger-blood drawn at 7 P.M. The wound is healing, and the surrounding induration has disappeared, but the glands, especially the femoral, are still swollen on the right side. He tells me that these glands have been big—but on this side only—for over 10 years, and that once, long ago, they were inflamed. For a year or two he has had very little fever, but formerly was more subject to it.

28th January—This afternoon, pierced the enlarged femoral glands and drew off, rapidly dropping, about 2 ounces of salmon-coloured lymph. (Dr JAMIESON of Shanghai was present.) In one slide of this lymph found a very languid and faintly granular embryo. One slide of blood drawn and examined at 6 P.M. contained one active embryo.

14th February—Two diachms of lymph drawn from glands. A full slide of this contained 12 active filariae. One of these examined with a high power looked perfectly healthy and normal.

This man remained under observation for about two months after the abscess was opened, and therefore after the death of the parent filaria which was connected with the enlarged femoral glands, yet during all this time his blood contained at the usual hours a fair stock of embryos—apparently as many at the end of the two months as at the beginning. It is fair to infer from this, either that there were other mature female worms alive in his lymphatics, or, if the dead specimen removed from his thigh was the only one, that the young filariae keep alive for several months both in lymph and blood.

Dr P MANSON'S Report on the Health of Amoy for the Half-year
ended 31st March 1882

DURING the six months, the health of the community, both native and foreign, has been good. In autumn, within certain districts a severe and often fatal form of remittent fever prevailed, but the areas in which this was epidemic were very limited. The population as a whole was not implicated, and the disease did not attack any foreigners.

The following were the deaths during the six months —

Sailor	Intermittent fever
Portuguese (female)	Phthisis
Sailor	Cirrhosis of liver—ascites
Infant	Convulsions

Dr W W MYERS's Report on the Health of Takow and Taiwan-fu (Anping)
for the Year ended 31st March 1882

THE health of the community during the period under review has been on the whole very good. No deaths have to be recorded either from ships or among the residents. But little, therefore, remains for me to say under this head. Before passing on, however, to report on the included settlement at Taiwan-fu (Anping), I am constrained by further experience once more to call attention to the peculiarly good effects apparently produced on tubercular disease by residence in Takow. I am not unmindful that it is by no means uncommon for various places and climates to be vaunted as being specially suitable to consumptives, and I am also aware that further trial has very often failed to establish the reputation the primary description would seem to warrant.

With this before me, I have been naturally more cautious in forming the opinion I now express, namely, that even in very advanced cases of pulmonary disease, residence at this port materially modifies the distressing symptoms, and in a great number of instances, not necessarily of recent standing, the progress of the disease seems to be arrested, weight increased, and a comparatively satisfactory condition of health attained. There are several cases which I might quote, both from private and native practice, in illustration of the views I advance, but it will perhaps be sufficient if I briefly mention one or two of the most typical, whose state elsewhere warrants the supposition that resort to Takow entailed improvement in their condition.

A late resident, with marked hereditary tendency and considerable personal disease, undoubtedly acquired a degree of health and comfort unattainable elsewhere. During the two years she was under my observation the disease, the previous activity of which was readily made out, seemed to be arrested, and so confident was I that this happy effect was due to local influences that I felt it my duty to warn both herself and her friends of the probable consequences of departure from Takow.

About a couple of months after leaving this port, I gathered that the disease had once more begun to progress, and a month after that I was informed of her death. I have no hesitation in asserting my belief that had the patient been able to remain here, the malady would have lain dormant for a much longer period, and without, of course, attempting to define its duration, that life would consequently have been considerably prolonged.

My predecessors have already reported on patients suffering from phthisis who have been unusually benefited by residence here, and I will therefore content myself with referring to another case, viz, one of tubercular laryngitis, the fatal termination of which I recorded last year.

The subject of it, also with the very strongest hereditary taint, had, on account of certain ominous symptoms manifested some years ago, been recommended by Dr P MANSON to come here. This he was able to do, with the result, as the patient himself informed me, of acquiring during his stay of six years such "robust health that he had so far forgotten his previous tendency when he went on leave to England as to lead him to believe all danger past." He had not been long away, however, before the malady once

more showed itself, taking the form above indicated, and although he hurried back, matters had gone beyond the limits of possible amelioration. Though this case, therefore, cannot be quoted as evidence of the curative properties sometimes observable in the climate, still, when I recall the suffering generally associated with laryngitis and its almost complete modification in the case under notice, I feel justified, as the outcome of most careful observation, in ascribing this result to climatic influences, and recording the fact with an appreciation readily comprehended by those who have had to watch cases less favourably affected.

In a word, therefore, while by no means asserting that phthisis, no matter how desperate its extent, can be cured by living in Takow, still I believe that, from causes which I cannot entirely explain, a degree of comfort, even in advanced cases, can be acquired which would be gratefully appreciated by many to whom the sufferings preceding death, so often experienced in other places, are felt to be less bearable than the prospect of that which under any circumstances is inevitable.

In seeking for the cause, I cannot say that I have arrived at a completely satisfactory conclusion. The more marked effects would seem to be confined to the locality comprehended by the settlement, and in this area I am not aware of any modification in the results obtained by varying the altitude or site of residence. For instance, with cases resident at Anping, though one meets with those more or less beneficial effects generally found in a temperately warm and equable climate, still, when disease has either been progressing or the symptoms have become more than usually annoying, I have been able, by moving the patient to Takow, to obtain what seemed to be either a cessation of disease itself or such a modification of its manifestations as to give the greatest possible satisfaction to both the sufferer and myself.

Taking only the fact that Anping and Takow have the same access to the sea breezes and nearly the same atmospheric conditions, I should be at a loss to account for the superiority of the latter if the cause were only to be sought in this way, and I am therefore inclined to ascribe a good deal to the presence of sulphurous acid, with which the air in the immediate vicinity of our settlement is moderately charged. Both on the hills forming the westward boundary of the harbour and at their base on the shores of the lagoon, just above high-water mark, are several sulphur springs, from which a discharge of gas takes place at all times. From the position of these springs in relation to the hills, the gases emanating from them are equally disseminated over the settlement by the winds of either monsoon. That of the north-east is concentrated as it passes down the funnel-like valley prior to reaching the settlement, while the south-west breezes, obstructed by those hills, so to speak rebound from them. This is a theoretical, but I do not think an improbable, method of accounting for a fact not easily explained otherwise. From the time when, as pupil and dresser to Professor LISTER, my attention was first directed to the general efficacy of antiseptics in certain conditions, I was led to try carbolic inhalations in phthisis, and in my first Medical Report on Chefoo,* written in 1872, it will be seen that I called attention to the benefits derivable from their use. The researches which have taken place from time to time as to the nature and origin of tuberculosis, the more prominent of which are those lately published by KOCH,

* *Customs Medical Reports*, III, 39

readily explain the rationale of their action. Within the last year, Dr SINCLAIR COGHILL, of Ventnor, has called special attention to the effects of antiseptic inhalations in pulmonary disease, and has, I believe, also devised some form of respirator. It would seem that several others, having adopted this treatment, also speak enthusiastically of it. In the application of a general principle established and popularised by the founder of what has now become an all but universally accepted system, one can scarcely claim credit for carrying out ideas in directions the exact and unimportant details of which are not precisely defined by the originator of the principles acted on. It seems to me, however, that these facts all tend to support the suggestions I submit as to the probable cause of that with which I am just now particularly concerned. The much-lauded benefit of the so-called "sulphur cure" for pulmonary disease will, perhaps, be remembered, and although there was, no doubt, much exaggeration connected with its introduction, subsequent trial has shown that a considerable amount of good may be derived from the application of sulphurous acid in reasonable and bearable quantity, and that therefore its presence in the air here may be one of the causes of the local condition I have described. It is true that Formosa would seem to be a somewhat remote place for consumptives to resort to, but when one remembers how many there are who are able and willing to expend both trouble and money in obtaining relief, however slight, I am led to think by my observations that the desiderata so longed for by invalids thus afflicted may be looked for from residence at Takow.

Filaria Sanguinis Hominis—I regret to be unable as yet to furnish further particulars, on account of the difficulty I find in getting the filaria-nurturing mosquito, brought from Amoy, to live long enough to enable me to carry on my experiments on monkeys. I am inclined to believe that the primary cause of their mortality lies in the Formosa water, but I yet hope, by getting over at the same time a sufficient supply of Amoy water, to be able to do something in this direction. My description of the Formosa mosquitos also stands over for completion. With reference to the absence of elephantiasis and allied diseases attributable to filarial infection in South Formosa, I have been able to obtain further valuable confirmation from Dr P. ANDERSON, of the English Presbyterian Mission, who has had for the past six months almost the whole work of the outlying stations thrown on his shoulders. He has thus been obliged to visit from time to time many parts of the country, and I am therefore enabled to avail myself of his valuable corroboration, which, when added to the information already afforded me by my other missionary friends, would seem almost conclusive. Referring to the question of water-drinking among the Chinese, especially among the labouring classes, I am in a position fully to confirm all that Dr MANSON has said. Coolies and field labourers while at work quench their thirst by resort to the nearest water quite as frequently as do men in other parts of the world. In middle life, or after some severe or chronic illness, there does seem to be a superstition against drinking cold water, and the well-to-do are somewhat strict in observing this prohibition, their poorer neighbours also doing it as well as circumstances will admit. But up to a certain time of life, that is, among the young and healthy, I cannot find that any general rule is laid down or followed. These remarks apply only to those parts of China I have been resident in, and need have no bearing on Dr SOMERVILLE'S observations in the limited district to which he alluded.

Manson Memorial Hospital—The attendance during the past year has amounted to about 2,200 in and out patients, amongst whom, though there were the usual number and variety of cases, but few call for special notice

An amputation for elephantiasis scroti, in the person of an Amoy man who had come here suffering from the disease seven or eight years previously, was, I regret to say, unsuccessful, in consequence of secondary lesions

Another case (necrosis of radius), though presenting nothing of extraordinary interest in as far as the immediate disease and its treatment is concerned, may be mentioned, as its bearing on the accepted theories of syphilis is decidedly peculiar

The patient—a prostitute—gave the following history on admission. Five years previously she had contracted primary syphilis, followed in due course by secondary symptoms. This, after what appears to have been a pretty severe course of mercurial treatment at the hands of native practitioners, was, by her account, cured, and she enjoyed good health up to about 18 months prior to her application at the hospital. She was attacked at that time, however, with what would seem to have been periostitis of the long bones. Some months afterwards, abscesses formed in the right forearm, from which dead bone was occasionally discharged. On examination, she was found to be considerably debilitated, with distinct nodes on both tibiae, while the radius was diseased along its whole length. After suitable preparatory treatment I excised the bone, with very good after results. During the time she was in hospital, and before operation, a patient under my cure for gonorrhœa, with urethral chancre, pointed he out as the source of his malady, and I am in this case able to assert positively that he had neither previously nor since been in a position to contract disease elsewhere. I immediately examined the woman and found her suffering from an acute vaginitis, but although I looked carefully I could find no sign of abrasion nor ulceration. The contact from which infection had taken place occurred about a week prior to this investigation. She had not said a word of her vaginal complaint, which, however, soon gave way to astringent injections, with iodide of potassium internally. The male patient exhibited in due course all the manifestations of secondary disease.

Some interesting questions arise out of these cases, for instance, was the woman the subject of tertiary syphilis, and while so, did she communicate the disease in its primary form to another? Again, it may have been that in pursuit of her calling she had herself been brought in contact with fresh virus, to which her fortified condition only admitted action in the form of vaginitis, through which it was passed on to one more amenable to its effects. A further interest attaches itself to the case of the man, inasmuch as his malady took that form which, it will be remembered, led JOHN HUNTER to assert that gonorrhœa was capable of producing secondary disease. Here the chancre was situated somewhat low down in the urethra, and was not easily discoverable at first.

Hepatic Abscess—As far as my experience goes, this form of disease is somewhat rare among natives. One case presented itself during the past year which appeared to yield to operation, of course performed with antiseptic precautions.

Under this head I might allude to the not uncommon occurrence of purulent accumulation in the parietes above, or in localities adjoining, the liver, which may so closely simulate abscess of that organ as to be apt to mislead. Empyema has undoubtedly been frequently mistaken for abscess of the liver, and a case reported a few years ago from

Shanghai, when criticised by a prominent English surgeon, appeared to find its natural place among instances of mistaken diagnosis. This, however, is only one of the many difficulties that surround the diagnosis of this often obscure lesion. I would desire to guard myself against being thought to wish in any way to disparage what has been done in undoubtedly genuine cases by practitioners in India and China. On the contrary, the results sometimes attained afford grounds for hope in a disease that unhappily seems to be of somewhat frequent occurrence among Europeans in both countries, and which necessarily excites the gravest anxiety.

Native appreciation of foreign medicine in South Formosa seems to me to be more conspicuous than in other parts of this Empire, and is certainly of longer standing. This is undoubtedly due to the medical practice and teachings of Dr JAMES MAXWELL, of the English Presbyterian Mission. I have seldom heard of a foreigner succeeding in ingratiating himself with the Chinese to the universal extent Dr MAXWELL appears to have done in this island. Go where you will (not excluding some savage districts), "MA I-seng" is spontaneously spoken of and kindly inquired after, while the frequent presence of some one or other who, either in the person of himself or his relations, has been treated by Dr MAXWELL, engenders a state of confidence which renders further intercourse easy. The greater distance you are away from the city or other places where outside influences are apt to prevail, the more you notice that induced willingness to put aside those superstitions and prejudices that so frequently bar the progress of foreign medicine on the mainland of China. In bringing about this state of affairs, although to Dr MAXWELL, as the originator, favoured with greater opportunities of coming in contact with the country people, is due the major part of the credit, still a very great deal of praise must be rendered to those who, as his successors at the Takow and Taiwan-fu native hospitals, so ably carried on the good work he began, and it behoves us whose turn it is to assume the duty, to take care that everything is done to continue and increase the native confidence, and especially that it is not imposed on by those whose only motive can be personal aggrandisement.

I have been induced to make the foregoing remarks by the fact of there having sprung up in Formosa a horde of charlatans who, under the guise of having been connected with foreigners—no matter in what capacity,—and therefore authorised to dispense Western medicine, will, if not checked, in course of time do much to destroy the good previously accomplished. A man under some pretence or other obtains contact or reputed connexion with foreigners. Having thus secured the essential point, he proceeds as best he may to obtain a smattering of the names of certain foreign drugs, with a still slighter knowledge of their use, and, with naturally no ability whatever to diagnose the diseases to which these medicines are applicable, goes forth and styles himself a "thoroughly instructed Western physician." The preliminary instruction, I may remark, is imparted in a course extending over one or two months by some other miscreant who has already been introduced to the trade, and books or tables are drawn up to aid in this tuition, which, like the pidgin-English primer, is but a garbled counterfeit of the original it purports to represent. The audacity of these quacks quite equals that of their *confrères* in the West, and even their artifices take somewhat of the same form. Thus the most necessary article of equipment is a leaden or pewter

casting closely resembling in shape the ordinary physician's stethoscope. This is impartially applied to every patient immediately on presenting himself, and to any portion of the body that is stated to be affected. Of course, mysterious properties are attributed to it by its user, and some portion of the secret of foreign skill is ascribed to its use. Others go the length of purchasing eye instruments (which, unfortunately, they sometimes use), and midwifery and amputating cases, which, happily, as far as I know, they have hitherto contented themselves with exhibiting at stated intervals, else, with their utter ignorance of anatomy, disaster much more palpable, if not more serious, than that which already takes place must long ere this have occurred. With reference to vaccination, thanks to the influences I have before spoken of, not only is its efficacy a fact readily accepted, but the operation is eagerly sought after. Could a staff of trustworthy men be got together they might soon be taught this simple operation, and if kept supplied with genuine lymph, they would in a short time be able to spread its blessings over the whole country. As a proof of the anxiety shown by the people to avail themselves of this protective, I may mention that they willingly pay the impostors \$1 for every male and 50 cents for every female child vaccinated. In response to this demand, a gang of remorseless wretches—in many instances armed only with capillary tubes, which they fill with any fluid, from dirty water up to pus—have gone over the country pretending to vaccinate. I regret to say that through this a condition of incredulity is being set up, and, what is worse, even loss of life has followed the practice. At a village not far from this place a great number of children are reported to have died after inoculation with a fluid which had been styled vaccine lymph, and this event has naturally caused some little sensation. Mr Consul PHILLIPS, who takes a kindly interest in all such matters, was good enough to represent the case to the late Taotai, but if any steps were taken by that official, the effect would seem to have passed away, for the evil is as rampant as ever. These persons adopt a cunning method of ingratiating themselves with the public, stating something like the following: "We have received from the foreigner all the knowledge about disease he is capable of imparting, we are Chinese, and therefore understand the Chinese constitution in a way foreigners never can. We are therefore better able than they are to discover and treat disease in our countrymen, while at the same time we can so modify the effect of the strong foreign medicines as to extract all the good from them, while avoiding any baneful effects that might follow their administration by persons not equally conversant with the systems of the recipients." Were these men to content themselves with merely distributing, say, a drug like quinine, there would, perhaps, be not so much room for anxiety, but when I mention atropia, morphia, and strychnia, as also various tinctures, as of belladonna and digitalis, with DOVER'S powder (chiefly used as a specific for the consequences of dental irritation in children), as occupying prominent places in the list of drugs for ordinary use, but little need be said to show the dangers run. Travelling from place to place, the natural consequences of their criminality do not overtake them so quickly as might otherwise be the case, besides which, although the Chinese may at the moment, and without particular reference to the justice of the assertion, blame whatever medical man has last had control of a case, yet so fatalistic are their ideas in matters of this sort, that the feeling of resentment soon wears off, and the incident is forgotten.

In the total absence of any official system of inquiry into deaths associated, to however slight an extent, with the possibility of natural causes, the risk of interference from this source is reduced to a minimum. Of course, if things go on as they do now, and the number of illicit practitioners increases, a day must come when public attention will be aroused, but I fear that those in whose name these acts have been committed will run a chance, unless something is done to avoid it, of being selected as the objects of resentment in lieu of those really guilty.

There can be no doubt that it would be a great aid towards propagating the benefits of foreign medical science if duly instructed natives could be sent out. By "duly instructed," I mean men who have been taught, as far as it is possible, anatomy and physiology, and, subsequently, the higher departments connected with the practice of medicine, but I doubt whether this could be accomplished by mere connexion with the hospital as assistants, although a great deal of practical information might thus be gained, which, when taken with the other, would be invaluable.

I believe that a knowledge of English, French or German is the first, the easiest, and the most essential step towards the acquirement of professional knowledge. The best way of bringing this about would be to send a certain number of Chinese to the medical schools in Europe or America, but as the many difficulties surrounding this plan are often practically insurmountable, the alternative of binding over such persons as might be desirous of instruction for a period of three or four years, teaching them English, and, with the aid of models, plates, etc., the other subjects more immediately connected with their future duties, would provide men sufficiently capable, and whose education would guard them against the perpetration of those errors which are almost certain to be committed by anyone less informed. Acting on this view, two years ago I was able to secure two apprentices who have bound themselves to prosecute their studies under me for a period of three to four years. English has hitherto been the chief subject of study, and now they both have acquired a very fair knowledge of that language. Some kind friends at home have promptly responded to an appeal I made for the gift of a French anatomical manikin, and I am glad to say the cost (£60) has been nearly subscribed. This, with the books, plates, etc., of which I possess the necessary amount, will, I trust, simplify matters and enable me to attain my object. The chief apprentice acts at the same time as hospital assistant, and, I believe, really takes interest in his work. The principal attraction, of course, lies in the certainty that, when once pronounced fit to start in practice on his own account, with the backing I promise to give him should he satisfy such of my professional brethren as I can get together with myself, that he is worthy of the trust, he will be able to secure such returns as but few other callings open to him are likely to afford.

I must not conclude my remarks on hospitals without alluding to the good and extensive work being done by my colleague, Dr ANDERSON, in the mission hospital at Taiwan-fu. Both from its larger size and central position in the capital city he necessarily sees a great many more patients in the year than can fall to my lot here. Both in medicine and surgery a large number of interesting cases present themselves for treatment, and the statistics from the institution under his charge show most satisfactory results.

Opium-smoking—While looking over some books the other day, I came across a record of den-to-den visitation made by the late Dr J R CARMICHAEL, when attached to the London Mission at Canton, in 1862

As this question is exciting some interest at the present moment, I subjoin a copy of the tables he drew up. As far as I know, this will be the first statement of the kind published. It is evident that Dr CARMICHAEL carefully weighed the quantities which he notes, but it seems possible that they indicate the amount being smoked at the time of the investigation, and in this case should be multiplied by 3, or at least 2 (these being the probable number of times people indulge in a day), in order to obtain the whole amount daily consumed, otherwise the quantities given could not be reconciled with the known amounts consumed in a day by average smokers.*

Be this as it may, with the exception of a column wherein, for convenience of reference, I have made an approximate calculation of the corresponding Chinese weights—taking the mace as equal to a drachm,—the paper is essentially an exact copy of the original

A TABULAR STATEMENT in reference to OPIUM-SMOKING amongst the People of CANTON

The several cases were investigated and collected in the various 'opium dens' in the western suburbs and in the vicinity of the hospital during the summer of 1862—J R C

OCCUPATION	Quantity consumed daily	Mace (approximately)	Age	No of Years	REMARKS
Fish dealer	40 grains	0 7	45	3	General debility
Money changer	1 1/2 drachms	1 5	57	32	Phthisis, dulness left apex, pale and thin
Money changer	1 1/2 "	1 5	56	15	Thin, good health
Gambler	3 "	3	51	30	Fearfully thin and haggard
Tea dryer	1 "	1	30	10	Good health
Opium dealer	1 "	1	35	5	Good health, rather thin
Opium dealer	2 "	2	35	10	Thin, depressed appearance
Mendicant	1 "	1	53	10	Good health
No occupation	1 1/2 "	1 5	32	15	Depressed appearance
Tobacco dealer	1 "	1	33	6	Pale, thin, depressed, etc
Bamboo house builder	1 1/2 "	1 5	45	8	Depraved look
Tea dealer	1 "	1	37	22	Good health, pale, thin
Tea dealer	1 1/2 "	1 5	23	4	Good health
Mandarin's follower	1 1/2 "	1 5	49	10	Thin, exceedingly depressed
Watchman	1 1/2 "	1 5	43	5	Good health, depraved
Fortune teller	80 grains	1 33	38	10	Good health, depraved
Silk dealer	1 drachm	1	54	30	Thin, pale, depraved
Fruit dealer	1/2 "	0 5	20	2	Excellent health
Fruit dealer	1 "	1	22	2	Pale, good health
Student	3 "	3	35	18	Dyspepsia, dreadfully debilitated.
Shoemaker	1/2 "	0 5	40	5	Good health, thin
Papermaker	1 "	1	28	7	Cough, good health.

* Since writing the above, I notice that Dr DUDGEON, in his review of the Customs *Opium* publication, states as follows with reference to the daily consumption of opium per head "Forty years ago it was calculated in candareens, a heavy smoker in those early days having his habit satisfied with a small amount. From that time till this the amount consumed has gone on gradually increasing. This is not to be explained on any other hypothesis than adulteration." Further on he quotes 3 candareens as being the average consumption of 30 years ago, and as Dr CARMICHAEL's records were taken 20 years ago, the quantities given by him may, after all, represent the whole daily consumption

OCCUPATION	Quantity consumed daily	Mace (approximately)	Age	No of Years	REMARKS
No occupation	50 grains	0 83	50	30	Thin, depraved
No occupation	20 "	0 33	27	1	Very depraved appearance
Fruit dealer	20 "	0 33	18	2	Good health
No occupation	1 drachm	1	46	20	Thin, good health.
No occupation	2 "	2	37	20	Good health, thin
Fish dealer	1 "	1	34	8	Good health, depraved
No occupation	1 "	1	30	3	Good health.
No occupation	1 1/2 "	1 5	58	30	Quite stout and healthy
No occupation	1 "	0 5	27	3	Good health, pale
Painter of porcelain	40 grains	0 7	42	2	Good health, stout
No occupation	2 drachms	2	32	15	Pale, good health
No occupation	6 1/2 grains	0 1	26	1	Good health
Cook	1 drachm	1	33	10	Depraved appearance, good health
No occupation	1 1/2 "	1 5	45	6	Good health, thin
Baker	1 1/2 "	1 5	30	10	Good health
Master of opium shop	3 "	3	38	10	Frightfully thin
Barber	1 "	1	36	5	Good health, thin
Dealer in flowers	1 "	1	20	5	Very thin, depraved
No occupation	20 grains	0 33	43	4	Strumous, thin
Watchman	1 drachm	1	41	20	Good health
Watchman	1 1/2 "	1 5	40	15	Chronic cough.
Dealer in sundries	40 grains	0 7	42	20	Good health
Dealer in the drug	2 drachms	2	53	30	Very thin and sallow
No occupation	20 grains	0 33	72	20	Good health.
No occupation	20 "	0 33	40	5	Good health, thin
Public singer	40 "	0 7	44	11	Good health, thin
Watchman	1 drachm	1	38	18	Good health.
Chinese physician	80 grains	1 33	60	40	Good health
Sailor	1 drachm	0 5	45	15	Good health, thin
Shopkeeper	1 1/2 "	0 5	50	30	Quite stout, good health
Dealer in old things	1 "	1	42	20	Thin, depraved.
Neglected to ascertain occupation	1 "	1	40	8	Emaciated, good health.
	1 "	1	64	40	Sallow, good health
	1 1/2 "	0 5	53	7	Sallow, good health
	1 1/2 "	0 5	51	8	Thin, good health.
Cook	1 "	1	45	10	Good health.
Public singer, blind from 7 years of age	4 "	4	30	8	This was the most disgusting object I had as yet seen in these opium hells, quite blind, with a dirty white complexion, complaints of an exhausting diarrhoea, earnestly desires to give up the opium
Dealer in herbs	1 1/2 "	1 5	40	10	Depraved aspect, good health
Boatman	1 "	1	38	3	Fearfully depraved
Boatman	1 1/2 "	0 5	35	13	Rather weak and thin
Builder	1 1/2 "	0 5	36	2	Cunning expression
Carpenter	4 "	4	38	11	Dyspepsia
Farmer	1 "	1	31	13	Good health
Tobacco dealer	2 "	2	23	1	Anemic, weak
Sing song house	1 "	1	18	3	Good health
Boatman	1 "	1	34	18	Highly nervous
Barber	1 "	1	44	15	Pale, thin, good health
Gambler	2 "	2	32	4	Good health.
Student	1 "	1	31	10	Good health
Boatman	2 "	2	30	15	Thin, dusky hue
Boatman	4 "	4	22	4	Good health, pale
Pawnbroker	1 1/2 "	0 5	51	14	Good health
Taoist priest	1 "	1	44	20	Dreadfully thin, good health
Cook in brothel	1 drachm	1	35	17	Good health
Singer	2 "	2	35	13	Good health
Cook	80 grains	1 33	34	15	Depraved in appearance
Cook	1 drachm	1	36	12	Good health
Wood dealer	80 grains	1 33	34	20	Good health, cough
Boatman	1/2 drachm	0 5	35	7	Good health, rather sallow

OCCUPATION	Quantity consumed daily	Mace (approximately)	Age	No of Years	REMARKS
Occupation not ascertained	40 grains	0 7	47	22	Depraved in appearance
	1 drachm	1	42	12	Good health, rather thin
	2 "	2	34	20	Very depraved, no disease
	$\frac{1}{2}$ "	0 5	50	10	Good health, jolly looking cove
	20 grains	0 33	35	5	Good health, rather dejected
	$\frac{1}{2}$ drachm	0 5	28	6	Good health, rather thin
Watchman	1 "	1	38	10	Most depraved looking fellow
Gambler	2 "	2	36	8	Good health, thin
Old clothes dealer, formerly student	1 "	1	18	2	Good health.
Confectioner	40 grains	0 7	25	18	Asthma
Farmer	20 "	0 33	26	11	Good health
No occupation	1 "	1	21	2	Excellent health
Green dealer	1 "	1	31	10	Excellent health
Cook	1 "	1	40	11	Thin, depraved
Opium dealer	20 grains	0 33	35	3	Pale, thin, rather weak
Old dealer	1 drachm	1	27	7	Very good health
No occupation	$\frac{1}{2}$ "	0 5	44	5	Good health.
Tea preparer	80 grains	1 33	32	10	Excellent health
Stone cutter	10 "	0 17	60	7	Excellent health
Cook	40 "	0 7	30	10	Rheumatism
Cook	1 drachm	1	26	4	Rather nervous
Carrier	1 "	1	35	11	Good health, thin

It ought to be mentioned that among the foregoing cases *not one of actual disease* occurred except *when specially stated* (The italics are Dr CARMICHAEL'S)

Taiwan-fu (Anping)—In consequence of the delay in dredging the Takow Harbour, a good portion of the direct trade that used to come to Takow has been diverted to the port of Taiwan-fu (Anping), which district has of late years shown unusual activity in the production of sugar and the consumption of opium. This, no doubt, coupled with the strong mercantile tendency there always is to be as near as possible to the "city of the port," has combined to give a much greater importance in recent times to the settlement formed up there, and which it would seem must increase as time goes on, unless something is done towards deepening the lagoon at Takow. But few foreigners outside of the missionary community reside in the city of Taiwan-fu itself, their houses, godowns, etc., being situated at the village of Anping, just below the old Dutch fort Zelandia, close to the seashore. This place is separated from Taiwan-fu by a low-lying plain, from which, since the time of the Dutch occupation, the sea has in great part receded. Anping itself is about a mile from the coast, on the banks of a creek that in one direction runs up to Taiwan-fu and in another communicates with a stream. At the mouth of this creek lies the celebrated Anping Bar, to cross which it is necessary to get into tubs placed on bamboo catamarans.

The plain itself at high water, especially in the neighbourhood of Anping, is in several places submerged, and, becoming uncovered at extreme ebb, exposes large tracts during certain portions of the day to the rays of the sun. From a sanitary point of view, permanent residence either at Taiwan-fu or at Anping is not likely to be free from objections. Foreigners have, it is true, raised the ground on which their houses are built, and in one instance at least—that of a double-storied dwelling—the greatest possible sanitary precautions have been observed.

in construction. Although natural conditions have thus been to some extent modified, I do not feel justified in speaking of the climate as a very desirable one. No doubt, during the day, when the exhilarating sea breezes are blowing, diluting noxious emanations and lowering the temperature, one is inclined for the moment to doubt whether the place can really be as objectionable as experience has proved it. The most prominent ailment is fever, evidently of malarious origin, but the peculiarity of its type attracts special attention. I do not know that I have ever seen a case of what is commonly understood by fever and ague, pure and simple, arise in the Taiwan-fu settlement. On the contrary, the disease common there is distinctly of the typho-malarial or mixed-fever class, indeed, were it not for the marked intermissions, so prominent are many of the typhoid symptoms, including spots, iliac gurgling, intense depression, etc., that one seeing a case for the first time would be very apt to call it typhoid, and to have his fears excited to a greater extent than is always called for. Of course, if often subjected to these influences and attacks, a state of depression is induced which eventually becomes alarming. As far as the mercantile community is concerned, the habit of making Takow head-quarters, and resorting thither as soon as work in Anping is concluded, does much to obviate evil consequences, and in cases of actual attack health is soon recruited by a prolonged stay there. With reference to the permanent residents, a short stay is sufficient to produce in them such appearances and ailments as one would expect from the state of affairs I have described, and, in fact, unless a man was of a perfectly strong and healthy constitution, I imagine he would run no little risk were circumstances to necessitate his remaining long in that city. On these grounds, therefore, it will be very regretful should events so turn out as to call for a fixed settlement in that part of our district.

As a remarkable proof of the peculiar local influences in relation to the characteristic disease of the place, I may allude to the fact that in the north-east monsoon, when the prevailing winds are more or less off the land, persons on board ships lying in the roads who have had no contact whatever with the shore, and to whom no shore water has been supplied, are often stricken with this Taiwan-fu fever, and in their case the consequences are much more grave than those observed among regular residents. In fact, by far the greater number of cases on board ship coming under my notice occur in the vessels lying off Anping.

During the months of December, January and February, the climatic condition is very much improved, and if a similar state obtained during the rest of the year, much less could be said in disparagement.

At present, by means of a small steamer which runs twice a week between Anping and Takow, communication is both easy and regular, and to the kindness of the proprietors I am indebted for the ability to visit that part of my practice at these times.

For the readings from which I have compiled the annexed meteorological abstract, my obligations are due to Mr Harbour Master FIELD. Taking the last two years' records, the mean temperature at Takow is, for the whole year, about 76° , or for the seven cool months, about 72° , and for the five hot months, 83° . In the summer this is about the coolest place in China, the mercury rarely touching 90° , and a fresh breeze generally blowing

ABSTRACT of METEOROLOGICAL OBSERVATIONS taken by the Customs, Takow, for the Twelve Months ended 31st March 1882 Latitude, 22° 36' 14" N , Longitude, 120° 16' E

DATE	BAROMETR		THERMOMETERS				SELF REGISTERING THERMOMETERS		RAIN IN 24 HOURS	WIND Force as per Naval Scale		No of Days in each Month on which no Rain or Snow fell
			Dry Bulb		Wet Bulb		Max. in Air	Min in Air				
	9 30 A M	3 30 P M	9 30 A M	3 30 P M	9 30 A M	3 30 P M	9 30 A M	9 30 A M		9 30 A.M	3 30 P M	
1881	<i>Inch</i>	<i>Inch</i>	°	°	°	°	°	°	<i>Inch</i>			
APRIL —												
Max	30 19	30 12	86	89	80	81	87	78	41	5	7	26
Mean	30 10	30 02	78	81	74	75	82	73	017	2 34	3 43	
Min	30 02	29 92	72	72	65	66	72	65		1	1	
MAY —												
Max	30 24	30 14	88	87	87	83	88	79	1 10	5	7	26
Mean	30 04	29 97	84	84	80	80	85	76 5	54	2 9	5	
Min	29 91	29 84	78	73	74	70	80	68		2	2	
JUNE —												
Max	30 06	30 95	92	92	87	84	92	82	3	7	7	21
Mean	30 01	29 95	86	85	82	81	87	78	27	3	4.6	
Min	29 86	29 80	77	77	74	75	80	74				
JULY —												
Max	30 03	30 01	92	90	85	89	93	83	3 08	10	8	13
Mean	29 89	29 85	81	80	77	82	84	77	7	4	4	
Min	29 74	29 58	77	74	76	76	82	75		2	3	
AUGUST —												
Max	30 02	29 94	85	86	84	83	89	82	10	10	10	11
Mean	29 84	29 80	82	79	78	76	80	79	1 84	4	5	
Min	29 60	29 03	76	77	73	75	79	73		2	3	
SEPTEMBER —												
Max	30 02	29 95	84	86	83	85	90	90	6	9	8	23
Mean	29 90	29 84	83	83	77	79	87	77	1 5	3	4	
Min	29 25	29 10	79	79	77	76	81	72		1	2	
OCTOBER —												
Max	30 15	30 07	85	84	80	80	89	79	34	6	7	22
Mean	29 94	29 89	80	84	73	76	84	74	13	2 9	4 3	
Min	29 68	29 64	73	74	69	69	75	68		2	2	
NOVEMBER —												
Max	30 23	30 15	80	81	75	76	85	77	3			31
Mean	30 13	30 02	73	78	72	73	79	74	9			
Min	30 02	29 96	72	73	68	71	74	70				
DECEMBER —												
Max	30 32	30 26	78	80	76	77	80	75	1 10	Observations no longer taken	Observations no longer taken	30
Mean	30 14	30 08	73	74	73	75	76	68	1 10			
Min	30 07	30 00	68	69	65	67	70	62	1 10			
1882												
JANUARY —												
Max	30 33	30 25	75	77	73	74	79	75	08	Observations no longer taken	Observations no longer taken	29
Mean	30 22	30 19	71	72	68	69	72 8	67 4	08			
Min	30 08	30 04	64	64	61	62	65	60				
FEBRUARY —												
Max	30 32	30 24	75	74	72	73	79	70	35	Observations no longer taken	Observations no longer taken	22
Mean	30 18	30 10	68 2	69 1	66 2	66 6	71 93	61 6	09			
Min	29 93	29 85	61	62	59	59	60	48				
MARCH —												
Max	30 30	30 15	76	78	74	75	83	73	65	Observations no longer taken	Observations no longer taken	26
Mean	30 15	30 07	69 4	70 6	67 1	68 3	72 64	61 02	19			
Min	30 02	29 97	66	67	63	64	65	50				

D^r E A ALDRIDGE'S Report on the Health of Hoihow for the Half-year
ended 31st March 1882

ABSTRACT of METEOROLOGICAL OBSERVATIONS taken at the CUSTOM HOUSE for the SIX MONTHS
ended 31st March 1882 Latitude, 20° 3' 13" N , Longitude, 110° 19' 3" E

YEAR AND MONTH	WINDS							MERCURIAL.				No of Days Fog	No of Days Rain	AVERAGE RISE AND FALL OF TIDES	
								BAROMETER		THERMO METER				Highest	Lowest
	No of Days N to E	No of Days E to S	No of Days S to W	No of Days W to N	No of Days Variable	No of Days Calm	Average Hourly Force	Highest and Average Highest	Lowest and Average Lowest	Highest and Average Highest	Lowest and Average Lowest				
1881							Miles	Inch	Inch	°	°			Ft in	Ft in
October	22	4		3	2		3	30 17 29 99	29 70 29 94	83 80	71 77		11	6 0	5 6
November	28	2				2	3	30 27 30 10	29 94 30 00	79 76	67 74	3	14	5 6	5 0
December	31						2	30 38 30 19	30 01 30 04	77 70	59 67	2	10	5 0	4 6
1882															
January	26	3			2		3	30 40 30 23	30 00 30 17	79 68	56 65	3	2	3 6	3 0
February	24	2		2			2	30 43 30 22	29 83 30 16	74 65	54 62	2	3	4 0	3 6
March	20	7		2	2		3	30 32 30 17	29 83 30 01	79 69	57 65	2	7	4 0	3 6

The weather during the last three months of 1881 was very disagreeable, the rainfall being much greater than that during the same period of any year since the opening of the port. October was ushered in by a strong north-east blow which lasted for four days. The lowest reading of the barometer was 29.70 inches, and there was no further indication here of the typhoon that was raging at the same time on the east coast of the island, where the ss *Quanta* was wrecked. November was likewise a wet month, and differed much from the same month in 1880, when we had not a single wet day. We have had very pleasant weather this year, for the most part fine, cool and bracing. The lowest reading of the thermometer was 54°, which was noted on the 4th February. There have been no freshets of any consequence, and the river has not overflowed its banks to any great extent.

The health of the foreign residents, who now number 16, has during the last six months been very good. Excepting one case of chronic rheumatism of the knee-joint, and one of palmar abscess, both of which turned out very favourably, all other complaints for which I have been consulted were of a trivial character. Among the native population the

mortality has not, I am told, been large. Diseases of the respiratory organs have been more prevalent than usual, but that may be accounted for by the unusually damp weather that occurred during the latter months of 1881. I hear that deaths from malarial fever among the troops despatched hence to quell the disturbances occurring in the south of the island have been very numerous.

A Chinaman from the Tung'hwa Hospital in Hongkong arrived here last November, but after vaccinating about 300 persons, he left for Pakhoi. Since his departure, six petty officials have been sent down here by the Viceroy to perform vaccination among the native population of Hainan.

I think the following case may be considered of sufficient interest to deserve reporting. The notes I give were taken last July, but at the time I wrote my last Report I wished to obtain further information about the case.

16th July 1881.—A middle-aged naval surgeon, of vascular temperament, apparently in good health—whose brother when the same age was suddenly, when on the west coast of Africa, seized with hæmatemesis, of which he died, the cause of the hæmatemesis being uncertain, whose family history, moreover, was good,—was astonished two years ago to find that he failed to pass the medical examination for an assurance company. The cause of failure was unknown, unless it was on account of his having had a mild attack of yellow fever previously, in addition to two attacks of remittent fever. Since having had yellow fever he has been troubled with a weak stomach. For some years he has spent the greater portion of his time at sea. During the few weeks he has been on the China coast he has been taking out door exercise, which, considering the great heat, has been of too severe a character, and has often brought on nausea and vomiting. His appetite has been fairly good, and he has not lost much flesh. He has suffered from dyspepsia, but drinking hot fluids has not caused pain in the stomach. The bowels have lately been very much constipated, necessitating the administration of a large amount of aperient medicine. His health since he came to China has never been such as to require absence from work. For the last day or two he has not been feeling well. Late this afternoon he passed a small motion requiring a great deal of straining, shortly afterwards he began to feel faint, and on getting up to walk his legs seemed to give way under him. During the evening he had a glass of brandy, after which he vomited over the ship's side, it being too dark at the time to see what it was he vomited. The faintness increasing, I was summoned on board, but before my arrival he had taken a second glass of brandy, which caused him to vomit, and it was seen that he had brought up a large quantity of blood.

17th July.—I found him lying on deck with a large pool of blood at his side. At first he failed to recognise me, and he was for some time in a most critical condition. His pulse at times was almost imperceptible. Every few minutes he fainted, upon returning to consciousness he moaned a great deal and complained of pain in the stomach and head. His head was bathed with iced water, and iced cloths were laid over the epigastrium, but had frequently to be removed on account of the severe burning pain they occasioned. He took strong doses of dilute sulphuric acid, and from time to time drank iced claret and water. At 3 A.M. there was another attack of hæmatemesis, but only a small quantity of blood was this time voided, the fainting after this not returning, there was reason to believe that the hæmorrhage had ceased. In addition to the pain in head and stomach, he complained of a feeling of suffocation, the heart's action was fluttering, and the sounds extremely feeble. At about 7 A.M. he vomited a small quantity of fluid, but no blood. The stomach was said to feel very full, and on placing a stethoscope over it the pulsations of the abdominal aorta could be heard. He had insatiable thirst, though ice, acidulated iced water, and strong cold beef tea were given him at frequent intervals. About noon the bed-pain was used, the motion was small and of a tarry character, only a few drops of urine were passed. During the day the thirst continued, pain was complained of in the calves, the voice was feeble, prostration great, the patient being unable to

raise his arm to drink, or his head from the pillow, towards evening he had another motion like the first, during the night he slept for a short time, but frequently asked for iced drinks

18th July—Pulse a little finer and more regular, complained of palpitation and shortness of breath, sight was dim, and the general surface of the body was blanched, the muscles feeling soft and flabby, conjunctiva of a pearly whiteness. In the morning he was unable to micturate, although he had swallowed large quantities of fluid, he had only passed a few drops of urine, there was still great thirst, but less than on the previous day, tongue brown, pulse feeble, there was great helplessness, the patient requiring to be lifted when he wished to change his position. In the afternoon about a pint of urine was passed. Towards evening palpitation came on, together with headache, pain over the cardiac end of the stomach, flushing of the face, and thirst, temperature, $99^{\circ} 6$. Ice to swallow and iced water to the head relieved these symptoms, and during the night three or four hours' sleep was obtained.

19th July—He felt better, the thirst, so bad the night before, had lessened, there was pain in the stomach, considerably increased by any pressure, taking a deep breath, or coughing. Beef tea, jelly, etc, were given at frequent intervals, towards night the hectic symptoms returned, the pulse rising to 110 and the temperature to $99^{\circ} 8$.

20th July—He had passed a good night, and his condition was much improved, during the day he was able to take nourishment, and the hectic symptoms at night were milder.

21st July—During the day he complained of a tingling sensation at the end of the fingers, and there was fancied loss of sensation in the right arm, there was also weakness of sight. In the evening there was a good deal of flushing of the face, and palpitation, the temperature rose to $100^{\circ} 8$.

22nd July—There was some improvement in the general symptoms, though the patient was still very helpless, heart's action feeble and pulse weak, the sounds of the heart were normal, though not loud, the bowels were moved during the day, hectic symptoms at night milder.

23rd July—From this date he continued slowly to improve, though, as might have been expected from the loss of such a large quantity of blood, his strength returned very gradually.

27th July—He left to-day for the hospital in Hongkong, he still complained of pain over the cardiac end of the stomach. Until his departure, the only food allowed had been of a fluid character, and was always taken quite cold.

After being in hospital some time, he was allowed to take out-door exercise, during which he exposed himself injudiciously to the sun, and an attack of meningitis was produced which led—after continued delirium for 29 days—to his death, that event occurring about two months after he was taken ill here. The postmortem examination indicated meningitis with cerebral congestion, together with such a diseased condition of the coats of the stomach as might be expected from the symptoms that showed themselves during life. The fact that the faintness, weakness, and feebleness of the heart's action began after the severe straining at stool, leads me to believe that a vessel in the wall of the stomach gave way at that time, while the pain over the cardiac end of the stomach pointed to that place as the seat of the ulceration. Had what was first vomited been seen, treatment might have been adopted sooner, while the brandy, which was naturally taken to combat the increasing failure of the heart's action, would have been omitted. I should judge that at least a couple of pints of blood was vomited, but I am only able to guess at the quantity.

D^r F CARROW'S Report on the Health of Canton for the Eight Months
ended 31st March 1882

DURING the period under review, we have to record but few cases of illness. Among the Chinese there has been no epidemic since the winter of 1880-81. The only thing worthy of note is that an unusually severe form of remittent fever prevailed to a limited extent among foreigners. Two cases of recent date have had to be sent to northern ports, after long-continued and large doses of quinine, carbolic acid, etc., had been used without apparent effect. I have been led to notice the more frequent occurrence of these severe forms of continued remittent fevers each succeeding year, especially with fevers which have a typhoid character. The cases have occurred, without a single exception, in people who have resided here for more than 10 years, while those who have but recently come always have it lightly. Patients perfectly strong and vigorous in other respects are attacked without warning, and often without cause which they themselves can see, and when this has been the case, I have always had to order a change of climate, not having succeeded in effecting anything more than a temporary cure by all the known remedies. Then, too, I have noticed that after the first attack is experienced the disease recurs regularly every year in January, February or March. Again, those whose business brings them into the open air seem to be less liable to these climatic changes and diseases than those who lead sedentary in-door lives.

Syphilis prevails to a frightful extent in Canton, and we can only hope for a remedy to this evil when laws which govern inspection of prostitutes in some of our Western cities have force here,—and that is a long time in the future. I have to record one death from typhoid. There were two births.

For the accompanying tables I am indebted to Mr Assistant Tidesurveyor IFFLAND
ABSTRACT of the CUSTOMS METEOROLOGICAL TABLES from April 1881 to March 1882

MONTH	WINDS							WEATHER			BAROMETER				THERMOMETER			
	No of Days N to E	No of Days E to S	No of Days S to W	No of Days W to N	No of Days Variable	No of Days Calm	Average Hourly Force	No of Days Fog	No of Days Rain	Rainfall in Inches	DAY		NIGHT		DAY		NIGHT	
											Highest Reading and Average Highest	Lowest Reading and Average Lowest	Highest Reading and Average Highest	Lowest Reading and Average Lowest	Highest Reading and Average Highest	Lowest Reading and Average Lowest	Highest Reading and Average Highest	Lowest Reading and Average Lowest
											Inches	Inches	Inches	Inches	°	°	°	°
1881							miles											
April	6	21	2		1		5.6	2	20	11	{ 30.18 29.99	29.76 29.91	{ 30.15 29.96	29.80 29.93	85 76	60 71	80 70	58 69
May	6	11	8		6		4.3		14	7.3	{ 30.20 29.97	29.81 29.91	{ 30.18 29.95	29.81 29.93	91 84	67 78	85 78	65 76
June	1	19	7		3		4.2		13	5.4	{ 29.98 29.88	29.70 29.84	{ 29.94 29.85	29.72 29.82	91 87	71 81	88 82	71 79

MONTH	WINDS							WEATHER			BAROMETER				THERMOMETER			
	No of Days N to E	No of Days E to S	No of Days S to W	No of Days W to N	No of Days Variable	No of Days Calm	Average Hourly Force	No of Days Fog	No of Days Rain	Rainfall in Inches	DAY		NIGHT		DAY		NIGHT	
											Highest Reading and Average Highest	Lowest Reading and Average Lowest	Highest Reading and Average Highest	Lowest Reading and Average Lowest	Highest Reading and Average Highest	Lowest Reading and Average Lowest	Highest Reading and Average Highest	Lowest Reading and Average Lowest
											Inches	Inches	Inches	Inches	°	°	°	°
1881							miles											
July	1	21	4	1	4		5		15	9.8	{ 29.90 29.81	29.65 29.76	{ 29.91 29.81	29.65 29.72	93 89	79 82	89 83	78 80
August	4	15	8	2	2		5.3		18	10.4	{ 29.96 29.81	29.50 29.76	{ 29.97 29.79	29.50 29.77	95 89	78 83	91 84	78 81
September	6	12	1	2	9		4.7		8	2.6	{ 30.07 29.91	29.62 29.87	{ 30.02 29.90	29.63 29.89	96 88	77 82	91 83	75 80
October	17	12	1	1			6.6		3	4.4	{ 30.17 30.03	29.57 29.95	{ 30.11 30.00	29.40 29.95	93 83	67 77	85 74	63 73
November	14	12		2	2		4.8		11	1.3	{ 30.29 30.12	29.93 30.06	{ 30.20 30.09	29.97 30.08	85 77	55 69	79 72	55 68
December	28	1			2		6.9		6	1.7	{ 30.37 30.21	29.98 30.14	{ 30.35 30.17	29.98 30.15	83 68	49 61	75 62	49 58
1882																		
January	20	6			5		4.2	3	7	0.8	{ 30.36 30.22	29.98 30.18	{ 30.44 30.20	30.01 30.17	78 68	45 59	74 61	43 58
February	20	3		3	2		5.1	2	4		{ 30.39 30.20	29.79 30.13	{ 30.36 30.16	29.80 30.14	73 63	47 55	69 59	45 53
March	17	4			10		5.2		9	2.5	{ 30.31 30.16	29.86 30.08	{ 30.28 30.13	29.89 30.10	80 69	50 64	75 66	49 58

REMARKS.—During April, rain fell on 20 days, measuring 11 inches, in May, on 14 days, measuring 7.3 inches, and in June on 13 days, measuring 5.6 inches. In the previous year, rain fell during the month of April on 14 days, measuring 3.8 inches, in May, on 24 days, measuring 7.6 inches, and in June, on 28 days, measuring 11.9 inches. Rain fell during July on 15 days, measuring 9.8 inches, in August, on 18 days, measuring 10.4 inches, and in September, on 8 days, measuring 2.6 inches. In the previous year, rain fell during July on 10 days, measuring 3 inches, in August, on 19 days, measuring 8.9 inches, and in September, on 12 days, 11.1 inches. Rain fell during October on 3 days, measuring 4.4 inches, against 7 days' rain, measuring 0.3 inches, in the corresponding month of last year. Light drizzly rain fell during November on 13 days, measuring 1.3 inches, while no rain fell in the corresponding month of last year. During December, rain fell on 6 days, measuring 1.7 inches, against 6 days' rain, measuring 1.3 inches, in the corresponding month of last year. Light rain fell during January on 7 days, measuring 0.8 inches, while no rain fell in the corresponding month of last year. Light drizzly rain fell during February on 4 days, measuring almost nothing, against 17 days' light rain, measuring 1.3 inches, in the corresponding month of last year. Light rain fell during March on 9 days, measuring 2.5 inches, against 11 days' rain, measuring 5 inches, in the corresponding month of last year.

The prevailing winds during the months of April, May and June were from E to S, no strong winds or gales occurred. The prevailing winds during the months of July, August and September were from E to S, and the strongest wind, on the 22nd August, from N to E, averaging 21 miles per hour during the 24 hours. The prevailing winds during October were from N E and S E, and the strongest, from N E, on the 14th (barometer 29.40), averaging 20 miles per hour during the 24 hours. The prevailing winds during November were from N E and S E, and the strongest, on the 21st, averaging 10.7 miles per hour during the 24 hours, from N E. The prevailing winds during December were from N E, and the strongest, on the 14th, averaging 11.3 miles per hour during the 24 hours, from N E. The prevailing winds during January were from N E, and the strongest, on the 31st, from N E, averaging 15.6 miles per hour during the 24 hours. The prevailing winds during February were from N E, and the strongest, on the 3rd, from N E, averaging 12.5 miles per hour during the 24 hours. The prevailing winds during March were from N E, and the strongest, on the 2nd, from N E, averaging 10.4 miles per hour during the 24 hours.

Dr J A STEWART'S Report on the Health of Foochow for the Half-year
ended 31st March 1882

THE health of this district has been exceptionally good for the last half-year, indeed, I may extend my remark and say it has been exceptionally good for the last year. Perhaps no healthier year could be recorded in the medical annals of Foochow—not one that I know of, at least.

There has been one death, due to persistent, progressive anæmia, in a patient who had long suffered from derangements of the liver.

The health Report of this district has been now properly brought to its close, but as it is understood that I should append any observations I may have made, or any experience occurring to me, I shall do so.

As it has been remarked in a former Report of this district that the distinguishing type of disease has changed, I can only add to this remark that this year confirms it. It was said before that ileo-colitis had been the distinguishing type, but that it was supplanted by malarial fevers, that these fevers were generally slight and fleeting, though protean in their forms, but sometimes very severe, if rarely deadly. This year we have had no genuine case of ileo-colitis, any more than we have had during the past five or six years, while remittents and intermittents we have had, and without marked abatement of their own particular predominance.

Two cases of remittent fever assumed a very low, or typhoid, type, while one affected the brain in an extreme manner after the force of the disease had apparently spent itself, for the pulse had then gone down from 120 to less than 100, and the temperature, from having been 104°, had descended to 99°. The peculiar affection of the brain manifested was persistent hallucinations. The patient was perfectly rational, knew that he had hallucinations. No mind could be clearer than his at the time, or could reason better. I consider his case quite phenomenal, and could ascribe it only to a special confinement of the disease, or rather some sequelæ of the disease to some portion of the optic nerve. It must have been affected, or in an instant state, when the rest of the brain was normal.

The hallucinations were accompanied with insomnia, as might be expected. A few doses of hyposulphurous acid procured sleep and allayed the hallucinations. Speaking of hyposulphurous acid, I have found it of very great benefit in all fevers when manifesting an approach to lowness of form, whether these fevers were malarial proper or true typhoid, indeed, I rely upon it more than on any other remedy—that is, when given early. A strong objection to it is its sharp pungent smell. I generally administer it till the system seems thoroughly pervaded with it, which is manifested by the patient being unable any longer to bear it, and this he soon proves after being borne over the line where convalescence begins, indeed, I am in the habit of regarding intolerance of it as a good symptom.

Our most delicate patients, children of two years of age and under, have stood forward prominently during the past half-year in health, and what holds good of them during the past half-year maintains its place for the half preceding. I do not know, however, anything which strikes me more forcibly than the health of very young children now, as compared with 10 years ago and earlier. Then, no summer could be got over without these young charges, or, to speak more strictly, a certain quota of them, becoming the subjects of severe dysenteries, varied by infantile cholera, which required but a very few hours to destroy its victim. This was so well recognised and marked a feature that neither Dr BEAUMONT nor myself ever entered a summer without a certain definite apprehension, and from some sad experience and undeniable conclusions arrived at, we both refused to become responsible for any infant fed by spoon or bottle instead of by nurse. Now dysenteries occur, but of a comparatively slight character, while the deadly infantile cholera is non-existent. Mothers, too, have rebelled against the good sound old dogma of never attempting to bring up a child by hand or bottle, and thus far with entire impunity. It seems to me as if I had almost dropped into a new world. I have no doubt that there is a wave in disease, and that we in Foochow are just now on the top of the wave. No one can prophecy, though, when or how soon we shall be in the hollow. That we shall be some time, and that all the old types and virulencies of disease in some degree will reappear, I do not question, meanwhile, it is pleasant to be as we are. Albeit, I think he is wisest who will not sleep on his guard against the foe.

I am quite of the opinion that the greater attention now paid by adults to diet, whether in its solid or liquid form, has helped to ward off disease from them, or to ameliorate it when it comes. The comparatively pure milk at present at command, not forgetting the much better prepared infants' food and tinned milk than used formerly to be had, has done a great deal for the children. People who know Foochow as it was once can well coincide with me here. With an excellent recreation ground, increasingly being made use of, and particularly by the ladies and children, who are in most want of such a thing, we ought all to be better off on the score of health in the future.

I will conclude this paper with a few notes on the actions in my hands of a few drugs, because I understand everything of the sort is invited.

For syphilitic sores I have found iodoform extremely useful, the same may be said when herpes præputialis is the complaint. Where I have, though, found iodoform most useful is in a bleeding cracked condition of the meatus ani. I had two cases of fissure of the anus where it did away with the necessity of the scalpel.

Citrate of caffeine I have found useless given in 2-grain doses for megium. In 4-grain doses—that is to say, in one 4-grain dose followed in an hour or two by a second 4-grain dose, if necessary—I have found it of decided benefit. I have taken it myself in 5-grain doses with no worse feeling than a slight sense of fulness at the stomach and buzzing in the ear. The 2-grain dose is, in my idea, just as useless as the 2-grain dose of oxalate of cerium, which I have never found more advantageous than two drops of water. Ask an Indian doctor, too, who gives his oxalate of cerium in 10 or 15 grain doses, what the good of 2-grain ones is.

Tonga, by itself, I have no high opinion of, given along with citrate of caffen, say within half an hour to an hour after a 4-grain dose of the citrate, when the citrate did not appear to be taking the full effect, I have found it advantageous,—more so, perhaps, than a second 4-grain dose of the citrate would be

I have seen chrysophanic acid act most beneficially in all forms of skin diseases due to cryptogams, indeed, I have been taught to look upon it as a specific in these diseases, and one even more reliable in them than quinine is in malarial poisoning. I used to employ it, at first, in 10 and 20 per cent strengths, but I often use it now undiluted or unmixed, and that to the raw sore, applied to a raw on the skin, I have found it act energetically as a healer and diminisher of smarting pain. I have known it cure quickly both ringworm pure and ringworm aggravated to a very high degree by eczema, when sulphuret of calcium and other remedies had failed, indeed, seeing what a malodorous compound the sulphuret of calcium is, I do not see why it should ever be used while chrysophanic acid is to be had

There is one disease on account of which one ought, if possible, to be almost grateful to chrysophanic acid, and that is that cryptogamic form of disease which, attacking the palm in a very innocent-looking manner at the beginning, goes on to work and burrow and spread till the whole surface of the palm is changed, and little of it left except cracks connected by thin films of skin, the denudation is worst when it is associated with eczema, and the patient can not only not allow his hand to be seen, but must also keep nearly always rubbing what is already too tender to be touched living in chronic misery. Chrysophanic acid does not, without being given a due amount of time, cure this most persistent disease. It requires from two months to half a year at least for that, but is not that a great advance upon what otherwise seems hopeless?

I have noticed the long-continued use of chrysophanic acid give rise to conjunctivitis, I see this consequence is being noticed at present in England. The conjunctivitis is not severe, and readily passes off, so far as my experience has gone, upon giving up the acid for a short period

Dr G R UNDERWOOD's Report on the Health of Kiukiang for the Year
ended 31st March 1882

THE health of the foreign community at this port during the past 12 months may be said to have been good. There has been no epidemic of any kind in the concession, nor have the more common diseases of this climate been unusually prevalent. Beyond a few cases of bronchial catarrh, diarrhoea, and other ailments of less importance, there was little sickness in April and May. In June there were two cases of intermittent fever, which were slight, and readily yielded to treatment. One of the patients has had a recurrence of the disease three times since then. On the 26th July there was one death from the high atmospheric temperature and exposure to the sun, and on 2nd August another.

The first was that of an elderly man who had lived 18 years in China, and whose constitution was enfeebled. In May last, shortly after his coming to Kiukiang, he had a severe attack of diarrhoea, followed by a second in June, and, reduced in strength by these, when the hot weather came, cerebral symptoms were developed, from which he never rallied.

The second case was that of a man about 32, well-developed and healthy in appearance, but of irregular habits. While out of doors on the morning of 29th July, working at his trade, he suddenly became ill, and went home. He complained, on my seeing him immediately after, of severe frontal headache, pain in the cardiac region, and difficulty in breathing, and the heart's action was increased, the pulse 96, and the temperature 101°. Dry cold and other remedies were used, and he felt considerably better towards evening. The improvement continued next day, his pulse and temperature having come down, and the headache and dyspnoea had gone. He was strongly urged to remain in the house that day, and to be very cautious about exposing himself to the sun for several days. The following morning he was out when I called, and on 1st August at 4 P.M. I saw him out at work. The same day at 8.30 P.M. I was called to see him, and found him sitting in the street, shouting and singing, and was told that he had been drinking to excess in the afternoon. He was taken to his lodgings, and being uncertain, from the excited action of the heart and high temperature, how far the symptoms might be due to alcohol and to a return of the cerebral mischief, as he became more quiet, I washed out the stomach, and applied cold to the head. He seemed then disposed to sleep, and I left him for an hour. On my return he was comatose, his pulse rapid and weak, the temperature 104°, and his breathing stertorous. Stimulants, solution of ammonia and a powerful interrupted current battery were used, but all attempts to rouse to consciousness failed, and he died at 2 A.M., 2nd August.

There was no postmortem examination.

There was also in August a case of cerebral congestion, induced by the heat, in a child of 18 months. Though at one time in a critical condition, he made a good recovery. There were three cases of dysentery in September, all of which were readily amenable to dietetic and other treatment, and one case of severe remittent, from Ngankin, which also did well. From that time to December there was no illness of consequence, but in the last-

named month there was a case of typhoid fever. The disease, which was very well marked, ran its course without a single unfavourable symptom, and the patient quickly got well. There have been three births in the concession during the 12 months.

Missionaries and others who had occasion to go into the country round Kiukiang reported that there was very much sickness amongst the Chinese during the summer and autumn. One has little to guide in the formation of a correct opinion, but, judging from the character of cases seen at the hospital and from perusal of former Reports, I am inclined to doubt whether there was more than usual. In places away from towns, those suffering from illness are very often left lying outside in the daytime, while the weather is warm. Their appearance thus attracts the attention of the passer-by, who is impressed with the number he sees, and is apt to over-estimate it. In June there were reports amongst the Chinese of a very fatal epidemic at a village some 30 *li* east of Kiukiang. It seems to have been a severe form of remittent.

Three thousand one hundred and fifty-six Chinese applied at the hospital for medical assistance during the past year. Of these, 575 were cases of diseases of the eye and lids, 105 being sufferers from corneal ulcer in its various forms. Many of the worst forms of corneal ulcer began while the patient had or had just recovered from malarious fever, indeed, the debility induced by intermittent and remittent seems to be the starting-point of a large percentage of the cases seen here. Chronic conjunctivitis, with the resulting granular lids and pannus, is also very frequent amongst the eye cases. Many operations, including those for artificial pupil, nipectomy, cataract, pterygium, trichiasis, etc., were done with a fair amount of success. Of intermittent and remittent fevers, 287 cases came under observation, and of their direct results, anæmia, with enlargement of the spleen—and at times of the liver,—125. Of these last, 45 were also suffering from ascites. Of those who had anæmia alone, there were 57. Many of the cases with ascites were tapped several times, with the exhibition of iron in large doses, and, though the results were not so good as could be wished, the treatment proved the best I have hitherto tried. Of eight cases of cancerous oris only two did well, and these were treated by the free use of chloride of zinc, and stimulants with quinine. Of five cases of phlegmonous erysipelas of the lips, as seen at the hospital, all died. At Kiutechin, in December, a much-respected member of the French Mission here died from this disease.

Amongst diseases of the nervous system were two cases of laterospinal sclerosis, one of writer's cramp, and three of locomotor ataxy. The subject of writer's cramp was a student, who found his promotion stopped and his prospects ruined by the disease. Under the use of the interrupted current he improved considerably, but went away far from being cured. One of the ataxic patients is certainly much better since he came. The improvement is as much owing to his better circumstances as to medical treatment.

I have seen six cases of opium-poisoning during the year, and in all except one the patient was moribund when I was called. In every case assistance was asked at least four hours after the poison had been taken. Elephantiasis, common at the coast ports, is seldom seen here, only two cases having presented themselves this year, and these for some more pressing ailment.

Operations were performed for fistula in ano ten times, removal of tumours four times, hare lip five times, amputation middle third of leg once, perineal section for relief after ruptured urethra, causing retention, once, and many other minor operations

There have been three deaths in the hospital,—one from phthisis, another from gangrene of the leg after intermittent fever, and a third from blood-poisoning connected with diseased hip-joint

For the following abstract of meteorological record, I am indebted to Mr LAND, the Harbour Master —

YEAR AND MONTH	THERMOMETER			RAIN	
	Highest	Lowest	Average	Runfall in Inches	No of Days
1881	°	°	°		
April	87	48	65.5	7 $\frac{3}{8}$	14
May	85	59	69.6	10 $\frac{1}{2}$	13
June	92	64	76	14 $\frac{1}{2}$	13
July	92	70	84.5	10	10
August	93	71	84.5	4 $\frac{1}{2}$	8
September	93	65	75	3 $\frac{1}{8}$	8
October	83	51	66.7	5 $\frac{1}{8}$	8
November	71	41	56	3	8
December	57	30	43	5 $\frac{3}{8}$	9
1882					
January	75	30	44.5	5 $\frac{3}{8}$	8
February	54	32	43.5	4 $\frac{1}{8}$	9
March	76	35	51.9	3	7

Runfall for year, 70 $\frac{7}{8}$ inches

Dr ALEXANDER JAMIESON'S Report on the Health of Shanghai for the
Half-year ended 31st March 1882

ABSTRACT of METEOROLOGICAL OBSERVATIONS taken at the Observatory of the Jesuit Mission
at Sicauei, for the Six Months ended 31st March 1882 Latitude, $31^{\circ} 14' 32''$ N
Longitude E of Greenwich, $121^{\circ} 29' 8''$

DATE	Barometer at 32° F	THERMOMETER		Elastic Force of Vapour estimated in Inches of Mercury	Hu- midity, 0-100	Ozone, 0-21	Velocity of Wind per Hour	Mean Direction of Wind	Total Evaporation during Month	Total Rainfall during Month	REMARKS
		Diurnal Mean Temperature in Shade	Extreme Temperature in Shade								
1881	Inch	° F	° F	Inch			Miles		Inch	Inch	
Oct	Max	30 318 (18)	70 4	78 3 (3)	0 780	93 (13)	21	18 3 (29)			Seven days rain, between the 8th and 17th Maximum velocity of wind in 24 hours, 268 9 miles, on the 8th minimum, 50 2 miles, on the 11th.
	Mean	30 086	64 8		0 489	78	10	6 6			
	Min	29 859 (12)	60 1	42 4 (30)	0 209	61 (18)	2	0 6 (26)			
	Range	0 460	10 3	35 9	0 571	32	19				
Nov	Max	30 482 (25)	59 6	72 0 (9)	0 610	91 (28)	17	32 7 (24)			Twelve days rain Magnetic storm on the 10th A fine aerolite was visible in the northern sky at 2 30 P M on the 22nd Hour frost observed for the first time on the morning of the 23rd Maximum velocity of wind in 24 hours, 324 3 miles, on the 20th, minimum, 65 1 miles, on the 27th
	Mean	30 185	54 1		0 345	79	11	6 6			
	Min	29 947 (19)	50 0	30 4 (26)	0 106	66 (24)	0	0 6 (26)			
	Range	0 535	9 6	41 6	0 504	25	17				
Dec	Max	30 634 (19)	47 7	68 0 (11)	0 524	92 (1)	21	21 5 (17)			Eleven days rain Maximum velocity of wind in 24 hours, 364 5 miles, on the 17th, mini- mum, 72 8 miles, on the 19th
	Mean	30 372	43 3		0 232	78	12	8 0			
	Min	30 031 (1)	40 2	24 1 (31)	0 075	66 (31)	6	0 6 (21)			
	Range	0 603	7 5	43 9	0 449	26	15				
1882											
Jan	Max	30 587 (14)	47 2	67 5 (23)	0 445	95 (29)	21	25 2 (7)			Ten days rain Heavy rain on the 7th and 31st First fall of snow on the 7th Maximum velocity of wind in 24 hours, 332 3 miles, on the 10th, minimum, 85 miles, on the 13th
	Mean	30 322	41 4		0 221	82	13	8 2			
	Min	29 924 (23)	37 1	23 9 (11)	0 047	57 (10)	6	0 6 (2)			
	Range	0 663	10 1	43 6	0 398	38	15				
Feb	Max	30 557 (5)	45 1	52 7 (8)	0 358	92 (29)	21	28 2 (21)			Seven days rain Violent storm with heavy rain on the 15th Maximum velocity of wind in 24 hours, 428 2 miles on the 15th, minimum, 80 4 miles, on the 18th
	Mean	30 334	40 6		0 198	77	14	10 2			
	Min	29 831 (15)	37 1	28 4 (22)	0 083	59 (21)	8	0 7 (7)			
	Range	0 726	8 0	24 3	0 275	33	13				
March	Max	30 533 (13)	54 9	77 9 (18)	0 524	93 (30)	21	25 6 (26)			Seven days rain Maximum velocity of wind in 24 hours 376 6 miles, on the 29th, mini- mum, 87 4 miles, on the 9th
	Mean	30 213	47 3		0 232	70	13	8 1			
	Min	29 734 (18)	40 9	30 2 (6)	0 071	49 (27)	5	0 6 (7)			
	Range	0 799	14 0	47 7	0 453	44	16				

NOTE.—The figures in parentheses indicate the days on which the observations to which they are appended were made
Note that under the heading "Humidity" the maxima and minima registered are the diurnal mean maxima and minima, in
other words, they correspond to the two days of the month whereon the humidity was respectively greatest and least during
the 24 hours These additions to the usual abstract, and modifications of it, render it more complete, and therefore more
valuable

I have again to thank the Rev Father DECHEVRENS, S J, for his kindness in condensing
many pages of observations into a form suitable for these Reports

The following table is drawn up from the English and French municipal burial registers and from the books of the municipal sexton, which were obligingly placed at my disposal —

BURIAL RETURN of FOREIGNERS for the Half-year ended 31st March 1882*

CAUSE OF DEATH	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	TOTAL
Typhoid fever	1	2†					3
Remittent fever		f 1†					1
Pernicious fever		f 1		1‡			2
Cholera	5†						5
Scurvy						1†	1
Chronic alcoholism	1						1
Phthisis	1 f 1 f 1†		1 f 1			1†	6
Bright's disease	f 1						1
Apoplexy	f 1			1		1	3
Abscess of brain				1†			1
Spinal meningitis		f 1					1
Pleurisy			1†				1
Pneumonia			1		1	f 1	3
Gangrene of lung	1						1
Rupture of heart						1	1
Aortic insufficiency		1					1
Dysentery	1 1† f 1§						3
Diarrhoea		2†	1				3
Cancer of bowel	1			f 1			2
Intestinal obstruction	1†		1†				2
Cirrhosis of liver	1						1
Abscess of liver			1				1
Chronic nephritis				1			1
Albuminuria					1		1
Uremia						1†	1
Suicide	1						1
Drowned						1†	1
Uncertified	f 1‡				1		2
TOTAL	21	8	7	5	3	7	51

* Not including deaths among the Catholic religious bodies † Not resident ‡ 4 years old § 8 months old

Subtracting 1 case of suicide and 1 case of drowning, 49 deaths are attributable to disease. Of these 3 occurred among children under 5 years old, and of the remainder, 19 (17 males and 2 females) occurred among non-residents. The mortality among adult foreign residents was thus 27 (19 males and 8 females), the number for the corresponding period of 1880-81 having also been 27, but differently distributed between the sexes (23 males and 4 females).

The table may be still further analysed thus —

CAUSES OF DEATH FROM DISEASE among RESIDENT EUROPEAN ADULTS

Pernicious fever	1 female	Dysentery	1 male
Chronic alcoholism	1 male	Diarrhoea	1 „
Phthisis	2 males, 1 female	Cancer of bowel	1 „ 1 female
Apoplexy	2 „ 1 „	Cirrhosis of liver	1 „
Spinal meningitis	1 female	Abscess of liver	1 „
Pneumonia	1 male, 1 female	Chronic nephritis	1 „
Gangrene of lung	1 „	Albuminuria	1 „
Rupture of heart	1 „	Bright's disease	1 female
Aortic insufficiency	1 „		

16 males and 7 females

CAUSES of DEATH from DISEASE among NON-RESIDENT EUROPEAN ADULTS

Typhoid fever	2 males	Pleurisy	1 male
Remittent fever	1 female	Dysentery	1 „
Cholera	5 males	Diarrhoea	2 males
Scurvy	1 male	Intestinal obstruction	2 „
Phthisis	1 „	Uæmia	1 male
Abscess of brain	1 „		
	17 males and 1 female		

CAUSES of DEATH from DISEASE among the CHILDREN of EUROPEANS

Dysentery	1 female
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CAUSES of DEATH from DISEASE among NON-EUROPEAN ADULT FOREIGNERS

Phthisis	1 female (Macao)	Pneumonia	1 male (Manila)
„	1 „ „ (not resident)	Uncertified	1 „ „
Typhoid fever	1 male (Manila)		
	3 males and 2 females		

CAUSES of DEATH from DISEASE among the CHILDREN of NON-EUROPEAN FOREIGNERS

Pernicious fever	1 male (Manila)
Uncertified	1 female „
	1 male and 1 female

It will be observed that all the cases certified as cholera occurred among non-residents, —all, in fact, occurred among sailors. Year by year the same rule is observed, that it is only those who expose themselves without precaution to sudden changes of temperature, or to miasma arising from the ground within and around houses in the worst parts of the native quarters, or who have committed more or less obvious imprudences in eating and drinking, especially in drinking, or who are the subjects of chronic alcoholism, that present the group of often fatal symptoms, which it would be convenient to call cholera were it not that most people associate with this term the idea of epidemicity, and therefore of inevitableness.

One case of pneumonia in a lady, where both lungs were affected, and which proved fatal in March, was secondary to scarlatina. The rarity of this fever in Shanghai makes its occurrence worthy of special notice. Dr PICHON and I were satisfied as to the nature of the affection, and sufficient proof was afforded by the fact that six children in the house took the disease in turn, all presenting in varying degrees the classical symptoms.

CHINA.

IMPERIAL MARITIME CUSTOMS.

II.—SPECIAL SERIES: No. 2.

MEDICAL REPORTS,

FOR THE HALF-YEAR ENDED 30TH SEPTEMBER 1882.

24th Issue.

PUBLISHED BY ORDER OF
The Inspector General of Customs.

SHANGHAI
STATISTICAL DEPARTMENT
OF THE
INSPECTORATE GENERAL.

MDCCLXXXIII

INSPECTOR GENERAL'S CIRCULAR No 19 OF 1870

INSPECTORATE GENERAL OF CUSTOMS,

PEKING, 31st December 1870

SIR,

1—It has been suggested to me that it would be well to take advantage of the circumstances in which the Customs Establishment is placed, to procure information with regard to disease amongst foreigners and natives in China, and I have, in consequence, come to the resolution of publishing half-yearly in collected form all that may be obtainable. If carried out to the extent hoped for, the scheme may prove highly useful to the medical profession both in China and at home, and to the public generally. I therefore look with confidence to the co-operation of the Customs Medical Officer at your port, and rely on his assisting me in this matter by framing a half-yearly report containing the result of his observations at upon the local peculiarities of disease, and upon diseases rarely or never encountered out of China. The facts brought forward and the opinions expressed will be arranged and published either with or without the name of the physician responsible for them, just as he may desire.

2—The suggestions of the Customs Medical Officers at the various ports as to the points which it would be well to have especially elucidated, will be of great value in the framing of a form which will save trouble to those members of the medical profession, whether connected with the Customs or not, who will join in carrying out the plan proposed. Meanwhile I would particularly invite attention to—

a—The general health of during the period reported on, the death rate amongst foreigners, and, as far as possible, a classification of the causes of death.

b—Diseases prevalent at

c—General type of disease, peculiarities and complications encountered, special treatment demanded.

d—Relation of disease to $\left\{ \begin{array}{l} \text{Season} \\ \text{Alteration in local conditions—such as drainage, \&c} \\ \text{Alteration in climatic conditions} \end{array} \right.$

e—Peculiar diseases, especially leprosy.

f—Epidemics $\left\{ \begin{array}{l} \text{Absence or presence} \\ \text{Causes} \\ \text{Course and treatment} \\ \text{Fatality} \end{array} \right.$

Other points, of a general or special kind, will naturally suggest themselves to medical men, what I have above called attention to will serve to fix the general scope of the undertaking. I have committed to Dr ALEX JAMIESON, of Shanghai, the charge of arranging the Reports for publication, so that they may be made available in a convenient form.

3—Considering the number of places at which the Customs Inspectorate has established offices, the thousands of miles north and south and east and west over which these offices are scattered, the varieties of climate, and the peculiar conditions to which, under such different circumstances, life and health are subjected, I believe the Inspectorate, aided by its Medical Officers, can do good service in the general interest in the direction indicated, and, as already stated, I rely with confidence on the support and assistance of the Medical Officers at each port in the furtherance and perfecting of this scheme. You will hand a copy of this Circular to Di _____, and request him, in my name, to hand to you in future, for transmission to myself, half-yearly Reports of the kind required, for the half-years ending 31st March and 30th September—that is, for the Winter and Summer seasons

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I am, &c,

(signed)

ROBERT HART,

I G

THE COMMISSIONERS OF CUSTOMS,—*Newchwang, Ningpo,*
Tientsin, Foochow,
Chefoo, Tamsui,
Hankow, Takow,
Kuikwang, Amoy,
Chankwang, Swatow, and
Shanghai, Canton

SHANGHAI, *1st May 1883*

SIR,

IN accordance with the directions of your Despatch No 6 A (Returns Series) of the 24th June 1871, I now forward to the Statistical Department of the Inspectorate General of Customs, the following documents —

Report on the Health of Newchwang for the eighteen months ended 30th September 1882,
pp 1, 2

Report on the Health of Chefoo, pp 3-6,

Report on the Health of Wenchow, pp 18-21, each of these referring to the year ended 30th September 1882

Report on the Health of Ichang, pp 7-11,

Report on the Health of Kiukiang, pp 12-16,

Report on the Health of Ningpo, p 17,

Report on the Health of Amoy, pp 22-24,

Report on the Health of Canton, pp 25, 26,

Report on the Health of Pakhoi, pp 27-30,

Report on the Health of Shanghai, pp 39-46, each of these referring to the half-year ended 30th September 1882

Notes on an Epidemic Disease observed at Pakhoi in 1882, pp 31-38

I have the honour to be,

SIR,

Your obedient Servant,

R ALEX JAMIESON

THE INSPECTOR GENERAL OF CUSTOMS,
PEKING

The Contributors to this Volume are —

J WATSON, MD, L R C S E d .	Newchwang.
J G BRERETON, L K & Q C P, L R C S I	Chefoo
A HENRY, M A, L R C P E d, L R C S E d	Ichang
G R UNDERWOOD, M B, C H M	Kiukiang
W A HENDERSON, L R C P E d, L R C S E d	Ningpo
D J MACGOWAN, M D	Wênchow
B S RINGER, M R C S, L S A	Amoy
J F WALES, B A, M D, C H M	Canton
J H LOWRY, L R C P E d, L R C S E d . .	Pakhoi
R A JAMIESON, M A, M D, M R C S .	Shanghai

Dr J WATSON'S Report on the Health of Newchwang for the Eighteen Months ended 30th September 1882

THE meteorological table which I furnish below calls for no special remark. It gives in sufficient detail the climatic conditions which have obtained in the period with which it deals.

METEOROLOGICAL TABLE for the Eighteen Months ended 30th September 1882

YEAR AND MONTH	Highest Reading of Barometer (Ananion) for the Month	Lowest Reading of Barometer (Ananion) for the Month	No of Days Temperature fell below 10°	No of Days Temperature fell below 20°	No of Days Temperature fell below 32°	No of Days Temperature fell below 42°	No of Days Temperature was above 65°	No of Days Temperature was above 70°	No of Days Temperature was above 75°	No of Days Temperature was above 80°	No of Days Temperature was above 85°	No of Days Rain fell for upwards of 2 Hours in the 24	No of Days Snow fell for upwards of 2 Hours in the 24	No of Days no Rain or Snow fell	No of Days Thunderstorms occurred	No of Local Duststorms	No of Days High Winds prevailed for a longer Period than 2 Hours in the 24
1881																	
April	30.44	29.60			3	18	1					6		22			10
May	30.36	29.66				1	21	11	7	2		3		15			8
June	30.04	29.50					30	30	26	11	1	4		23			1
July	30.04	29.61					31	31	31	26	12	13		18			3
August	30.09	29.68					31	29	29	21	9	8		19			2
September	30.44	29.69					29	25	15	9		2		26			
October	30.61	29.91			1	9	8	4	1			1		29			3
November	30.63	29.23		7	25	26	4	1				4	3	25			1
December	30.86	30.14	9	25	31	31						1	3	28			3
1882																	
January	30.96	30.10	9	23	31	31						1	3	30			1
February	30.10	29.96	5	23	28	28							1	27			1
March	30.86	29.15	1	12	28	31						1	3	27		2	8
April	30.43	29.75			4	18	5	3				5		24		2	6
May	30.30	29.58					26	19						27	1		2
June	30.16	29.64					29	27	20	16	4	6		21			4
July	30.10	29.71					31	31	31	28	12	10		15	1		
August	30.52	29.67					31	31	31	20	9	3		24			1
September	30.50	29.69				4	26	21	18	9	3	5		22	2		1

Note.—The highest temperature registered was 95°, on 31st July 1882. The lowest temperature registered was 1°, on 24th December 1881. A strong gale from N.E., force of 8 to 9, commenced at 2 A.M., 4th October 1881, and moderated after daylight same day to a fresh breeze.

There have been 12 European children born in our settlement during the last 18 months. Of these, four were boys, two of them twins, and they both required to be delivered by

forceps Of the girls, one was a case of foot presentation Another of the girls was imperfectly developed, it never breathed freely, and it lived only five hours, it was peculiar in having on each hand six fingers, and on each foot six toes

One of the twin children, when born, 4½ lbs weight, breathed freely enough, but was unable to take food By means of injections, etc, it was kept alive 11 days, but it then died of inanition

In addition to the deaths of infants above referred to, there were three young children who died during the period under review

One died from inflammation of the brain, and two from the effects of exposure to extreme cold

The mode of death was different in these two cases In the one there was intense inflammation of the trachea and bronchial tubes In the other there was acute catarrh of the stomach and bowels, and passive congestion of the lungs The first was a fine, strong child, while the last was weak and delicate, but both sank rapidly

Three Roman Catholic sisters died from typhus Two of these I did not see at all, and the third case was beyond the reach of medicine when I was sent for There are seven surviving sisters, and all of them have had typhus

For the first time in our settlement—the Roman Catholic Mission is mainly outside it,—an undoubted case of typhus occurred The patient was a delicate and unhealthy young man, who had exhausted himself by over-exercise, and, it is believed, exposed himself to infection by visiting the Roman Catholic Mission He was delirious from the second day, and died on the thirteenth day of the fever

There was one other death,—a case of Bright's disease of the kidney and fatty heart The patient was one of the oldest residents, and for several years past had been in a very critical state For some weeks before his death there was general dropsy

During the 18 months to which these brief notes refer, a much larger European mortality has occurred than in any former similar period With the exception of the cases of the two young children, none of the deaths seem to have been induced by climatic conditions I long ago pointed out, however, that our winter months were very trying to young children, and it is absolutely necessary that they be well protected from its depressing influence

Some very interesting cases have come under my care during the last 18 months, and I hope at some other time to direct medical attention to them

Dr J G BRERETON's Report on the Health of Chefoo for the Year
ended 30th September 1882

For the following meteorological table, I am indebted to Mr JENNINGS, Harbour Master —

YEAR AND MONTH	THERMOMETER				No of Days Rain	No of Days Snow
	Highest	Lowest	Average	Average, 1880		
1881	°	°	°	°		
October	84	44	64	57	4	
November	67	28	47	44	2	1
December	54	18	36	30	2	7
1882						
January	50	18	34	27		5
February	51	22	38	29		1
March	74	26	50	45		
April	77	37	57	57	5	
May	98	48	73	68	1	
June	98	55	76	72	2	
July	100	68	84	77	5	
August	96	64	80	80	4	
September	89	57	73	72	2	

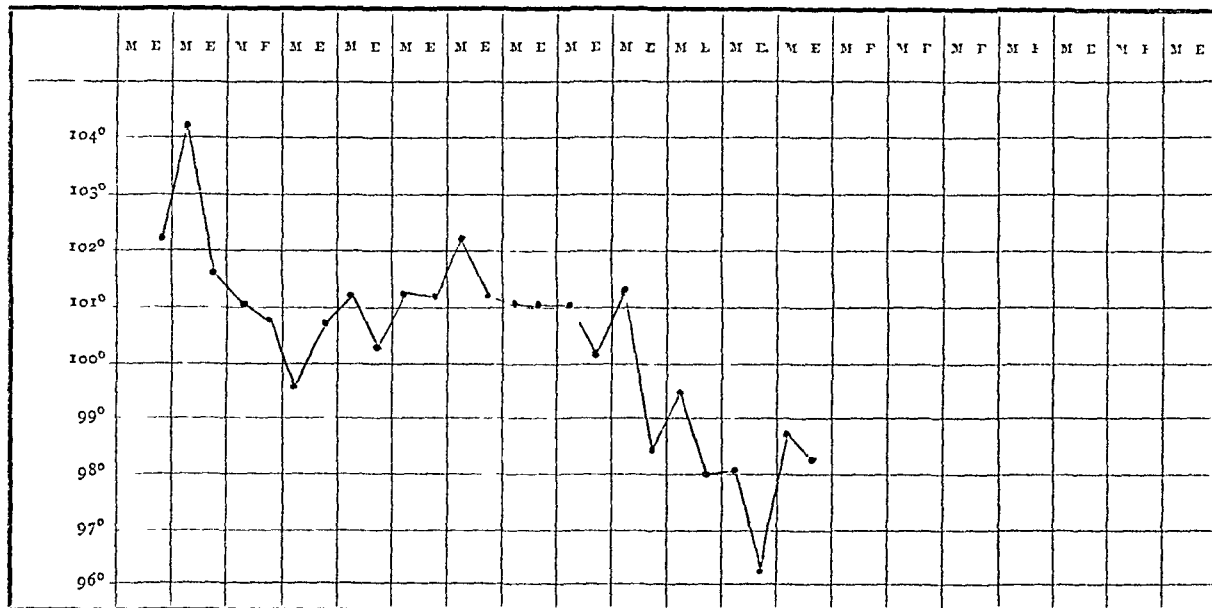
It will be seen from the above table that the temperature during the past year was fairly equable, the winter months having been exceptionally warm, and the summer by no means unusually hot. The amount of rain, however, was much less than in former years, and possibly to this may be attributed a considerable decrease in the number of cases of diarrhoea which generally occur during the hot weather. On the other hand, I have to record several cases of fever bearing many of the characters of typhus, but differing from it in various particulars. The disease was principally confined to the Chinese, only one foreigner having been affected.

The first case occurred in a Chinese boy residing at a missionary school, and in two or three days afterwards other children attending the school were laid up with it, until, finally, almost all the children became affected. The disease was not confined simply to the children, as two of the native teachers were attacked during the convalescence of the children.

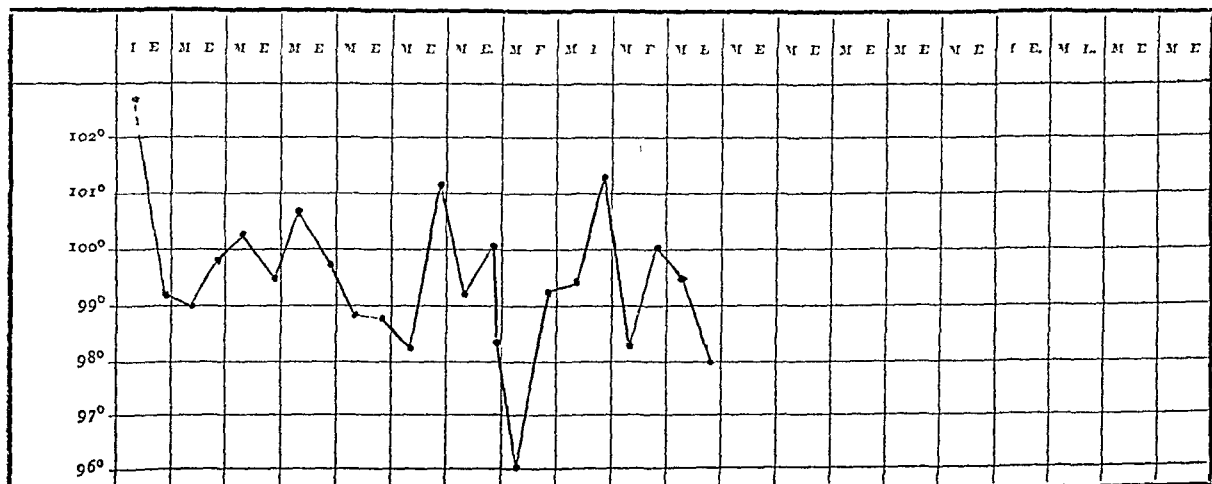
During this time, an adult foreigner, who had had no communication with the school for a week or 10 days previously, became affected, and in this case the temperature ran much higher than in the native children. The following charts will show the difference. At first there was considerable difficulty in distinguishing the character of the disease. In all, it came on in 48 hours, with great headache and constipation. On the fifth day, five or six brownish red typhus-looking spots appeared over

the chest and abdomen, which were permanent throughout, and did not disappear on pressure. In some, delirium was present, and all terminated favourably by a crisis of diarrhoea or sweating during the third week.

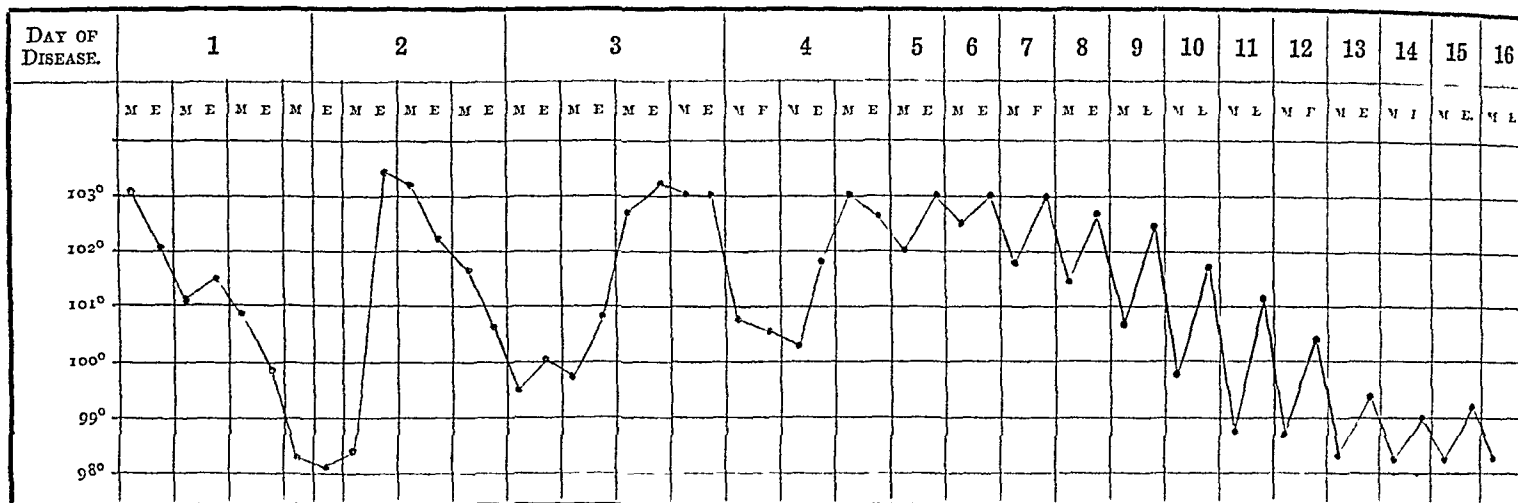
TEMPERATURE CHART of CHINESE, Age 14



TEMPERATURE CHART of CHINESE, Age 12



TEMPERATURE CHART



The deaths during the year were as follow —

Infant

Adult

„ (non-resident)

Convulsions

Inanition

Phthisis

Dr A. HENRY'S Report on the Health of Ichang for the Half-year
ended 30th September 1882

SINCE Dr McFARLANE wrote his Report,* two years ago, there has been no change in the conditions of life at this port. The number of foreign residents still remains about a dozen, made up of official and missionary elements. The foreign merchant has not arrived, nor, with the present manner of conducting trade in this country, is he to be expected. Thus, few in number, we are condemned to bear with evils prejudicial to health and comfort, which larger foreign communities settled in other parts of China have been able to cope with successfully. Our "foreign settlement" exists merely in name, serving as a convenient designation for the quarter of the suburbs in which is situated the British Consulate. For, with the exception of two buildings erected in foreign style during the present year, there has been no disturbance of the original Chinese character of the landscape. The quarter consists of a long row of hovels, perched on the slightly elevated bank of the river, and flanked behind by an equally long row of vegetable gardens. The latter, liberally and frequently supplied with night-soil, are the source of an intolerable stench, which prevails in the neighbourhood of our dwellings during the greater part of the year. The Custom House and Commissioner's residence are an adaptation of a Buddhist temple, placed near the city end of the line of hovels. In an adjoining compound the Customs out-door staff and Medical Officer reside, the former in a Chinese house, the latter in one of the foreign buildings just alluded to. The other foreign house is a large building to the rear of the Custom House, and it belongs to the French mission. The British Consulate is a Chinese house, on a site some feet below the level of the garden immediately behind it. The Scotch missionaries live inside the city, in Chinese houses. The great majority, therefore, of the foreign residents live in houses of a kind that cannot be rendered healthy or comfortable habitations. Built with mud walls, they are perilously hot in summer, and in rainy weather they are disagreeably damp and cold. Drains that are often blocked up, and mere receptacles for filth, are underneath, and the houses (with the exception of the Commissioner's residence, which has got a lath-and-plaster second storey) being one storeyed, the unhealthiness of the sleeping-places is apparent. The building of good houses, of a foreign type, is an imperative necessity in Ichang, if the foreign residents are to have ordinary health and comfort. With the present habitations, a low state of health is induced, even if dangerous illnesses are escaped.

In addition to the want of proper dwelling-places, absence of the most simple sanitary precautions on the part of the surrounding natives is a source of danger. Night-soil is carried through the streets in open buckets at all hours of the day. The privies, notwithstanding, never seem emptied, and the odours that emanate from them and from the vegetable gardens are simply sickening.

But if from man Ichang has derived these unhealthy, malodorous, and unæsthetic features, nature has tried to compensate by the lavish charms of the surrounding country

* *Customs Medical Reports*, xx, 18

The scenery of the gorges is well known, and the mountains that lie around in all directions, by their grandeur, their precipices, waterfalls, and lovely glens and valleys, make up scenery of marvellous picturesqueness. Though the roads in the immediate neighbourhood are wretched pathways, which become impassable with a shower of rain, so that walking is often scarcely feasible, yet there are many ways by which a healthy amount of physical exercise can be obtained. Game is fairly plentiful, and good shooting can be got within easy distances. A lawn tennis ground has been laid down by the English Consul. The river affords excellent boating in winter, and pleasant trips can be taken at all times.

The climate is like that of the other Yangtze ports,—extremely hot during one or two months of summer, but during the rest of the year, tolerably agreeable. Rain falls on a large number of days, as might be expected from the mountainous nature of the district. On the hottest days there is generally an up-river breeze, which, however, unfortunately lulls in the evening, and the nights, with their motionless air, and a temperature ranging from 80° to 85° F., render sleeping a matter of difficulty for weeks. I append a table, which gives an abstract of the meteorological readings for the six months, taken by Mr. Assistant Examiner LE BRETON.

Although Ichang is built on a low-lying alluvial flat, the portions of which that are not built over being graves, rice-fields, and odorous gardens, yet malaria does not exist in a severe degree. There has been, so far as I can learn (with one possible exception, which I shall refer to afterwards), no serious case of malarial fever or dysentery among the foreign residents of Ichang. Epidemic diseases, save small-pox, are unknown.

The native population is a sturdy one, coarse-featured and unintellectual, but healthy. The smoking of Szechwan opium is widely prevalent, and there is a large consumption of alcohol, and the sight of a drunken labourer or farmer reeling home from market, wake, or wedding, is common enough to be suggestive of life in Western lands. The dirty habits of the natives, rather than their vices, render them uncomfortable as regards themselves, and disagreeable to others. These habits explain the universal plague of parasites and parasitic diseases of the skin,—*porigo*, *scabies*, and *tinea* representing the latter, *pediculus*, *cimex*, and *pulex*, the former. But a mode of treatment has been devised, which I may term the “smoke-bath,” and which appears to be an Ichang invention, that might be recommended to the speculators at home in hydropathy, electropathy, and such-like, on the score of novelty. About sundown one may often see on the beach a naked form lit up by the lurid glare of a pile of burning shavings. The form waves a bundle of clothing frantically around in the smoke. This seeming “joss-pidgin” is merely the recognised and effectual mode of parasiticide.

There is not much practice to be obtained among natives. Willing enough to chance a dose of medicine, they will not endure a regular course of treatment.

One of my experiences was in the case of a woman who, in the eighth month of pregnancy, had been suffering from hæmorrhage for more than 10 days. The native doctors had pronounced the case perfectly hopeless. I was then sent for. I went to the house, a most wretched hovel, which, during the time of my visit, was nearly overwhelmed by the pressure of the crowd of natives who wished to see the foreign medicine-man at work. The woman refused to be examined by me except vicariously, by the fingers of an old midwife. Her condition was not so bad as might have been expected, and I risked the opinion that she might get over it. I came away, and next day she gave birth to a still born child, and finally recovered.

Prejudice equally closes the very extensive field that exists here for postmortem examination. Fatal accidents are common. During the early part of the year, a party of eight beggars, who were sleeping at night in a hollow in the bank of the river, were killed by the falling in of the superincumbent mass of earth and stones. A similar fate not long since overtook a coolie who was excavating clay in a pit hard by the Custom House. As proofs, however, of the existence of the sentiment of humanity, I may adduce two important institutions here, namely, free ferries, and the peculiar red boats, which are often effectual in saving life in the numberless cases of accident on the river at this place, and more especially higher up, in the rapids.

Suicide is wonderfully prevalent. The usual modes of ending life are by strangulation, hanging, and the swallowing of opium. Within a radius of 200 yards from the Custom House, eight cases have occurred in as many months. The family arrangements of the Chinese, which do not provide a separate home for each son as he marries, are to blame for most of these.

With regard to the health of the Customs staff during the half-year, I have to report favourably, no case of serious illness having occurred.

One of the staff was suffering from ranula when I arrived in April. It had been treated in Hankow, by cauterisation with acid, but it recurred. I made a free incision, and a probe being passed frequently afterwards, it gradually closed up from behind. This patient was just recovering from his third attack of hæmato chyluria. His weight and strength had been materially reduced during the seven weeks it lasted. Since then his health has been good, no recurrence of the hæmorrhagic condition has taken place,—the only noticeable fact being that in several small patches on various parts of the body the pigment has been entirely removed. I have searched for filariæ, but have been unable to find any. The late Dr. REID also searched for them, but with negative results.

Two or three accidents, not serious, occurred. One is illustrative of the risk incurred by attempting to extract a pin-fire cartridge with a common key. The cartridge in this case exploded, causing a burn, fortunately of little severity. Another case was that of a broken rib. Crepitus could not be found on manipulation, but all the other signs of fracture of a rib were present, and on auscultation a well-marked loud crepitus could be heard over a limited area, which was the spot complained of as tender. Some cases of diarrhœa, round-worm, and other trifling ailments, make up the sick list of the Customs staff.

I cannot speak so favourably of the health of the rest of the foreign community. Two deaths occurred among them.

The first case was that of a young Eurasian girl, a native of India. The evening I arrived in Ichang I was summoned to attend her. She had been ill for about a fortnight. The first symptoms were described to have been headache, dizziness, and diarrhœa. Worms were suspected, and she was dosed with santonine. Gradually she became worse, getting every day more and more feverish, then delirious at night, and then both night and day, and at times she sank into a lethargic state. No spots had been observed, and the diarrhœa stopped after the first three or four days. On the last day urine and feces were passed involuntarily.

On seeing the patient, she was lying prostrate, in a typhoid state, much wasted, eyes glazed, lips covered with sores, tongue brown, heart's action feeble, pulse, 140, lungs free from râles, and clear on percussion, abdomen tympanic, spleen not perceptibly enlarged. Next morning patient became much worse, gurgling could be discovered in the right iliac fossa, and some crepitation in the lungs. Coma rapidly supervened, followed by death in two or three hours.

No temperatures had been taken in the case. The history points to typhoid fever, but it is very questionable whether this disease, though known in Shanghai, occurs here. Dr REID told me that during his long practice in Hankow he had never met with a case of typhoid. The question then arises, was it a severe case of remittent fever, or one of those cases of so-called typho-malarial fever, the nature of which is not yet clearly settled. The patient had been in the habit of drinking large quantities of water, the proper filtering and boiling of which was doubtful. She lived in a Chinese house, and the state of the drains is unknown.

The second case of death occurred from heat apoplexy. This took place on the 2nd August. For some days previous the heat was extreme, the thermometer registering 95° F by day and 83° by night.

The patient was a man about 50 years of age, whose general health for some time previously had been very poor. He had been suffering for some days from diarrhoea, and in the wretched house in which he lived, sleep had been impossible for several nights. On the day before his death he went out at midday in the sun, and came in much fatigued, and lay down, sinking into a heavy sleep, with stertorous breathing. The day of his death, with extraordinary imprudence, he went out twice in the sun, the second time without hat or umbrella. This morning he had drunk a quantity of strong Chinese wine. One of his servants followed him, and found him lying in the street, unconscious. He was brought to his house. When I arrived, about an hour after the seizure, he was lying prostrate, breathing heavily. The skin was extremely hot, feeling dry and scorching, pulse small, irregular, and frequent, face livid, lips pale and covered with sordes, breath offensive, eyes closed, insensible to light, the pupils being contracted to the size of a pin's head, and the conjunctivæ injected. The body was insensible to pricking.

The treatment I adopted was cold water douching from a height, while, by fanning and by opening doors and windows, I tried to render the room as cool as possible, but its temperature remained very high. Unfortunately, there was no cooler place to which to remove the patient. I applied a blister to the nape of the neck. After a time, relaxation of the pupils occurred, and the surface temperature diminished. However, the breathing became more and more noisy, fæces were passed involuntarily, a cold clammy sweat spread over the body, and the pulse became almost imperceptible. I then discontinued in great measure the douching. Convulsive movements now affected the tongue, and in a short time the muscles of the body were similarly affected, so that the patient bumped up and down on the trestle on which he lay. The convulsions did not in the least spread to either arms or legs. The breathing became extremely noisy, and in about five hours from the time of seizure the patient died.

In this case it may be noticed that the patient was predisposed to an attack by his low state of health, his want of sleep during the preceding nights, and his imprudent habits. The time of seizure was about 4 P.M., when the maximum temperature of the day occurs. Evidently, the body was excessively overheated, and vaso-motor paralysis, with great pyrexia, consequently ensued. I could not obtain any trustworthy temperatures. The means of treatment at my disposal were very inadequate. Ice could not be obtained, and in this case the first indication, to my mind, was to reduce the body heat as quickly as possible, as the blood in its overheated condition was acting as a poison to the nervous centres. The convulsions only occurring in the trunk was an unusual symptom.

During this trying period of heat, which claimed one victim from among us, the natives suffered very much. Complaints of want of sleep were loudly expressed, but I heard of no

cases of sunstroke This disease is, however, well known to the Chinese I may here appositely quote the following passage from M^r E C BABER —

Heat apoplexy, known in Ssü-ch'uan as *Lei ssü*, or death from exhaustion, is a common and well-known cause of death among the Chinese, and there is, in my poor opinion and experience, no reason to suppose that foreigners are more liable than natives to suffer from it The latter, no doubt, resist exposure to the direct rays with greater impunity, but they are on the other hand less able to bear up against the weakening effects of a long period of exceptional heat, though relieved by the constant use of the fan and the habit of sleeping naked The nightly attacks of musquitos are not a whit less formidable to the Chinaman than to the Englishman, and much severer cases of the inflammation known as prickly heat may be found among the Ssü-ch'uanese than among the European colonists of Hongkong or Shanghai

A native of Chêkiang who was with us volunteered the information that in his province fatal cases of sunstroke are unknown, although people sometimes die of drinking cold water In his opinion, the Ssü-ch'uanese are more susceptible, on account of the thinness of their skins *

It appears that the Chinese have great faith, in such cases of exhaustion, in their favourite practice of acupuncture

ABSTRACT from METEOROLOGICAL TABLE

1882	THERMOMETER (FAHR)				BAROMETER		RAIN	
	Highest	Lowest	Average Highest	Average Lowest	Highest	Lowest	Runfall in Inches	Number of Days
April	82	43	66	56	30 14	29 55	5 38	16
May	89	57	77	67	29 89	29 44	9 32	17
June	88	67	79	72	29 85	29 35	8 96	22
July	95	70	86	76	29 87	29 48	6 83	20
August	97	69	93	77	30 01	29 57	3 07	7
September	87	59	79	70	30 19	29 81	5 22	17

* *Travels and Researches in the Interior of China*, by E COLBORNE BABER, pp 11, 12 London Murray, 1882, published for the Royal Geographical Society

Dr G R UNDERWOOD'S Report on the Health of Kiukiang for the Half-year ended 30th September 1882

THE health of the foreigners residing at this port was very good during the first four months of the half-year, but the two following were marked by an amount of sickness unusual in Kiukiang. The season was comparatively cool up to the middle of July, and the rainfall less than last year. We had, however, a great rise in the river, which was higher than it has been at any time within the last 10 years. In July and August the greater part of the Foreign Concession was under water, though in only three foreign houses was the ground floor covered, and hundreds of people, in the streets outside the city and in the surrounding country, were flooded out of their homes. Staging and boats were the only feasible means of getting about in the Concession and the Chinese streets behind. There was no loss of life in this neighbourhood, the rise being so gradual that people had ample time to prepare for removing to higher quarters. So long as the river continued to rise, there were few ailments. After it had fallen a few feet, cases of intermittent fever and dysentery began to crop up, which could only be ascribed to the decaying organic matter left by the flood, and the putridity of the water itself, where it was stagnant. On the Bund, where the water was constantly in motion, and where, when the flood began to subside, it quickly went away, the ground was dried at once by the sun, and there was not a single case of fever. In the back street there were nine cases of intermittent fever in six weeks. The water was under the floors of all the houses, and the lake behind having an imperfect outlet, it became stagnant, and at times developed a most unpleasant odour. It is not yet known whether there was more fever than usual among the Chinese. Certainly, in many instances families were driven from low malarial ground to camp on the hills about the city, and thus they had a chance of escape. Possibly, too, the washing away from the streets of the accumulated filth of years might lessen the amount of sickness due to that cause.

One case of Asiatic cholera was landed from the s.s. *Pekin* in August. The patient, a native fireman, was in a state of collapse when carried ashore, and died eight hours after, and 24 from the time of his seizure. There were, it is said, several other deaths from cholera on the river steamers, but none in Kiukiang, so far as my knowledge goes.

The following is a short *résumé* of the principal diseases treated during the half-year —

Towards the end of April a member of the Roman Catholic Mission of Kiangsi came under my care for dysentery, which had lasted more or less for two years. He was put on milk diet. Ipecacuanha and opium, and astringents by the mouth, were tried, without any beneficial effect. Enemata, containing 1 drachm of nitrate of silver to 3 pints of water, at a temperature of 98°, were then used, as recommended by Dr S. MACKENZIE*. At the end of eight days, during which he had, in all, three enemata, he was so much better as to require no further medicinal treatment.

* *Lancet*, 1882, 1, 640, 681

An interesting case of varicella prurigo, only less marked as to the itching than the case recorded by Mr HUTCHINSON in his *Clinical Lectures*, seems worthy of notice —

H B H, a strong, healthy child, of fair complexion, fed partly by his mother and partly with cow's milk, had good health up to January last, he then being four months old, and teething not begun. In that month, after slight fever, lasting one day, an eruption of rosary papules, in all, perhaps, 60 or 80, and accompanied by itching, was noticed on his head, back, abdomen, legs and feet, the soles of the feet being especially affected. On the breast and arms there was no eruption. Next day, when seen by me, many of the papules had become vesicles, filled, some with a clear, and others with a slightly turbid, fluid, and a number of fresh papules had come out. The diagnosis was varicella, and knowing that people had access to the child who came from houses where there were cases of variola at the time, he was vaccinated at once. On the third and fourth days, some of the vesicles had dried up, others were now umbilicated pustules, and others that had been broken were covered with a scab, and fresh papules were still appearing and maturing in the same way. Some of the pustules enlarged, leaving small scab covered ulcers, which healed in from 8 to 10 days from the beginning of the eruption. The vaccination ran its course without apparently being affected by the varicella. Except a little annoyance caused by the slight itching, and soreness of the pustules, the child was quite well, and took food as usual. Fresh papules continued to come, in diminishing numbers, till the end of March, when the eruption disappeared. The only treatment adopted was tonic, viz, quinine in small doses, and the compound syrup of phosphates, with calamine ointment to the sores on the limbs. In May the eruption returned, and was more troublesome on the soles, toes and legs than before, and the vesicles were larger. With it there was a little itching, but not marked. The former treatment, with a change to the hills, was advised. After a month at the bungalow in the Lushan the eruption quite disappeared, having lasted six weeks, and the patient's appearance was more healthy. In the present month—October,—the child being feverish with teething, the eruption returned in the same situations as before. This time the itching has been greater, though not a special feature, and the feet were swollen where the papules appeared. At the time this case came under observation no patients with varicella came to the hospital, but small-pox was prevalent in the city.

Intermittent Fever—In April, a case which had lasted one month, in a new-comer to Kiukiang, was much benefited by the change, and was cured before the end of the month. Three cases of intermittent, and one of severe diarrhoea, were treated in May and June, and all did well. In July, one patient who had had intermittent for months in the interior, and two others suffering from the same disease, came under treatment, and recovered quickly.

In the beginning of August, a case of dysenteric diarrhoea—in pregnancy—came under my care.

Though in a new resident, it proved most intractable from the first. Under milk diet, opium, bismuth and ipecacuanha, internally, and large warm-water enemata, it was a little better, when labour came on at the full term, and nearly three weeks from the beginning of the disease. The labour was natural and fairly easy, and the placenta and membranes came away readily, and without any shred being left behind, so far as I could judge. The diarrhoea was most troublesome during labour, but seemed less in the afternoon of the same day, the pulse was 80, and temperature 98° 6. The following morning the patient had a severe rigor, with temperature of 103°, quick pulse, and increased abdominal pain and tenderness. Opium, mustard plasters, etc, were used to relieve the pain, and the vagina was carefully washed with a solution of carbolic acid twice a day. The pain was removed, but the diarrhoea became worse in spite of all treatment, and the patient died on the ninth day after her confinement. That septic poisoning was the cause of death is certain, but whether by absorption from the uterus or of putrid faecal matter in the intestine is, I think, doubtful. The diarrhoea was brought

on by incursions exposure to a draught, the nights being very warm. During the whole of her illness the atmospheric conditions were unfavourable.

In the same month a case of acute dysentery yielded readily to ipecacuanha in large doses. Four cases of intermittent were also under treatment, and did well, as did three patients suffering from purulent conjunctivitis. The latter disease was transmitted by contagion from Chinese children. Seven patients with intermittent were also attended in September, and one case of mild typhoid ran a favourable course. Three cases of acute dysentery were under treatment also, and with a good result. In only one case of dysentery was the type severe. One patient suffering from gout applied for relief, and two cases of venereal disease had a successful result.

At the Native Hospital there were, during five months—the flood compelling a vacation of one month,—3,400 applicants for medical assistance, being 200 more than for the whole year 1881. The Chinese here, as in the other treaty ports, appreciate the benefit to be got from foreign medicine, as is shown both by the increased numbers and by the long distances they come. Our chief difficulty now is to find means for building a good hospital and carrying it on. The house used hitherto as a hospital is a damp, badly ventilated building of one storey, and the drainage and sewage arrangements connected with it of the rudest. It is at present in use temporarily as a home for the sisters of charity who have just come here, and meantime the patients have plenty of an space in a large godown. The foreign residents, though subscribing freely, are few, and the Chinese who care to give are limited almost entirely to those connected with foreigners, and to members of the congregation of the French Catholic Mission. The want of careful nursing and supervision has hitherto been a drawback to success. That is now remedied by the sisters of charity undertaking the care of inside patients, and I am hopeful that before next summer we shall have a building better adapted to the work than the present. Among others, the following case is interesting—

Ko YUCHU, aged 19, assistant in an opium shop at Hu-shih-peh, in Hupeh, was admitted on 26th March 1882, complaining of a tumour in the neck, which was a great hindrance to him in his work. The patient, of slender build, 5 ft 4 in in height, and fairly well nourished, was seen to have a large, rounded tumour, occupying with its base the whole of the posterior and part of the anterior triangle of the neck on the right side, and hanging down as low as the nipple. Its surface was smooth and rounded, and at one point on the anterior face there was an ulcer 1 in in diameter, the result of an injury. To the touch it felt soft and homogeneous, and measured, from the mastoid process over to the middle third of the clavicle, 20 in, and from the sternoclavicular articulation to the margin of the trapezius, 19 in. The patient said that it was painless, had been growing 15 years, and inconvenienced him much, by dragging his head to one side. It was diagnosed to be a fatty tumour, and on its removal being advised, the lad and his friends consented, and the operation was done on the 29th March. Consul JAMIESON gave chloroform, and two incisions were made, beginning at a point on the same level with and $\frac{3}{4}$ in behind the angle of the jaw, passing over the tumour, and separating from each other to the width of 2 in, so as to include the ulcerated piece of skin, and again converging to a point at the middle third of the clavicle. The tissues were then reflected on either side, so as to get behind the tumour, care being taken of the large veins, which were numerous, and ligatures put on them before division, where it seemed necessary. The whole of the posterior triangle was laid bare in the dissection, and the upper part of the anterior as well, a lobule of the tumour passing behind the sternomastoid, which—apparently somewhat atrophied—was exposed in its whole length, as was the

sheath of the common carotid, in the upper part of its course. The size of the tumour made it difficult to manipulate, though the chief danger to be apprehended was the entrance of air into the cut veins, in the acts of respiration. The tumour being removed, and the wound washed out with carbolic solution, the edges were brought together with stitches, a drainage tube being left in. The skin was just enough to cover the wound, though so little was removed, and now that it is healed there is a little puckering at the upper part of the cicatrix. The dressing used was lint, soaked in carbolic oil 1 to 12. In four weeks the patient was able to go home, the wound being entirely healed. An attack of intermittent retarded recovery somewhat. The tumour was a capital specimen of simple fatty growth, and weighed exactly 10 pounds. The accompanying drawings give a good idea of the appearance of the patient before and after the growth was removed.



In June the following case of malignant disease of the eye-ball was treated with a less fortunate result —

HU JUANPAO, aged 4, residing at Siao chi-kao, province of Hupeh, was admitted to the hospital on the 6th June, suffering from a fungating tumour, the size of a mandarin orange, protruding from the right eye ball. This growth, the parents said, had come in three months, was rapidly increasing, occasionally bleeding, and now and then painful. The child, still being nursed by his mother, was not apparently suffering from the disease constitutionally, and to give a chance of recovery, extirpation of the contents of the orbit was advised, it being explained at the same time that the probabilities of recovery were as 1 to 10, even with the operation. The parents having consented, the tumour, with the contents of the orbit, which were matted together, was removed, as far as possible, with knife and scissors, and the bleeding readily checked by a stream of cold water. The edges of the conjunctival bag being held apart, chloride of zinc paste spread on small pieces of lint was plastered all over the surface of the orbit, the lint being kept in position by a piece of dry cotton, as recommended by Lawson.

A compress of lint and a roller completed the dressing. The child had much pain for the first eight hours, and, unfortunately, part of both eyelids sloughed from the extension of the action of the chloride of zinc. In 10 days the sloughs caused by the caustic separated, leaving a clean, healthy-looking surface. Meantime there was slight swelling over the parotid gland on the same side, which developed a firm, hard base, with a small abscess on the surface. Within four weeks it was evident that the disease had recurred in the parotid, by that time the eye being entirely healed. Nothing further could be done.

I am indebted to Mr Harbour Master LAND for the following meteorological data —

1882	TEMPERATURE, MEAN		RAINFALL	
	Maximum	Minimum	No of Days	Inches
	°	°		
April	65 12	56 04	11	9 $\frac{4}{10}$
May	76 05	68 33	10	10
June	80 50	75 48	11	14 $\frac{6}{10}$
July	83 05	77 08	12	18 $\frac{11}{10}$
August	85 50	79 26	3	14 $\frac{6}{10}$
September	79 56	74 02	7	2 $\frac{1}{10}$

Dr W A HENDERSON's Report on the Health of Ningpo for the Half-year
ended 30th September 1882

THE hot season of 1882 has been extremely cool for Ningpo. For the four months, June, July, August and September, the maximum temperature was $77^{\circ}9$, and the mean minimum $74^{\circ}7$, the former being about 3° less than that of the two former years, and $7^{\circ}5$ less than that of 1879. Throughout the season there was a great deal of rain. In June, rain fell on 12 days, in July, 15, in August, 12, and in September, 11. Further, without almost any intermission, there was a daily sea breeze, which, together with the coolness, was productive of as reasonable a degree of health as is compatible with such a region as that in which Ningpo is situated. Another circumstance which must have contributed to the health of the community was the cleaning out of the drains. They had been neglected for many years, and in March last it was decided that, though late in the season, it would be a lesser evil to allow them to remain festering throughout the period of the greatest heat than to make the attempt then. The operation extended over a fortnight, beginning on the 24th March and ending on the 7th April. It consisted briefly of scooping up the accumulated filth, which was thrown into the river. Before beginning the cleaning process, through the Superintendent of Police the residents were advised to take quinine throughout the period, so far as could be learned, the advice was acted in accordance with, except in the case of two individuals, who both caught fever. In the one it took the form of the continued type, and in the other it lasted 24 hours, and was accompanied with vomiting and purging.

Dr D J MACGOWAN's Report on the Health of Wênchow for the Year
ended 30th September 1882

DURING the past year the few foreigners who reside at Wênchow enjoyed exemption from disease, but the general public health suffered interruption, owing to an exceptionally protracted rainy season, febrile and choleraic maladies prevailing more than usual, the poor being the chief sufferers, who, beside being badly housed, suffered from the enhanced price of rice, which the rains caused by injuring the crop. It is to be feared that the latter half of the year will not prove more favourable in a sanitary point of view. Unfortunately, opportunity for investigation of disease no longer exists at this port, owing to the removal of the Inland Mission Hospital, under Mr DOUTHWAITE, to Chefoo.

The rains, to which this impairment of the ordinary health of this region is due, commenced earlier, continued longer, and were more copious than usual,—occasioning disastrous floods throughout the catchment of the northern portion of the Nanshan range, causing destruction in the south-western portion of this province, as well as of Southern Kiangsi and Anhwei, and inundations of the Poyang Lake and Lower Yangtze. The occurrence is too recent to ascertain how far these disasters have proved causes of disease.

CHINESE EPIDEMIOLOGICAL NOTES

Prominence is given to the subject of epidemics in the instructions conveyed in the Circular of the Inspector General inaugurating these Reports, investigations of which call for extensive surveys, a report on the health of any one port may therefore, I assume, include reference to diseases that are found prevailing through the Empire at large.

Information respecting epidemics in the interior is supplied by correspondents of Chinese newspapers, these form the main source of the facts herein submitted. It is therefore meagre, but not an unacceptable contribution to climatal and epidemiological science.

These Chinese medical notices take cognizance, it will be observed, of meteorological and telluric influences as causes of disease, the exceptionally abnormal character of the weather during the summer of 1881, and the following autumn and winter, furnishing apt illustrations. The abnormalities consisted in a series of typhoons, of which there were a score, some of them extending late into the autumn. Then followed an "open winter," which was coincident with a like condition of weather which prevailed over the northern portion of the Europeo-Asiatic continent, at least, the winter was noted in North-eastern Europe as an unprecedentedly mild one. In Northern China, rivers and harbours experienced the ice blockade later, and the thaw occurred earlier, than usual. At the same time, barometric readings, which are always high in China during the winter, indicated a pressure greater than had yet been observed. Only statistical information can determine what effect those abnormal meteorological conditions had on the public health, and in the absence of vital statistics, we may

make some use of the consensus of "folk lore" This much is clearly discoverable, that while the atmospheric conditions affected an extensive area, there were no widespread epidemics corresponding to the cyclonic and anti-cyclonic phases that prevailed, those that are reported being local and sporadic

I append all that has found its way into Chinese newspapers on the public health during the two semi-annual periods under review, divided into the four seasons,—a plan that accords with Chinese usage, which regards certain types of disease as more or less prevalent at certain periods of the year, for example, in spring, (疫) infectious and contagious maladies prevail, as typhus and small-pox, in summer, (痧) spasmodic cholera, in autumn, (痢) diarrhoea and ague, and in winter, (瘟) non-malignant fever

OCTOBER, NOVEMBER, and DECEMBER 1881

NANKING (the ancient capital, situated on the right bank of the Yangtze river) —Referring to the early autumn, the reporter notes numerous sunstrokes due to untimely heat Showers that fell on the 20th September brought down the temperature, but it soon rose again, so that perspiration, even at rest, was excessive, and sleep unobtainable by night,—a state of things which was followed by a violent form of cholera, from which children suffered most

In the autumn there was a remarkable mortality among field rats at Nanking It was first observed on the opposite side of the Yangtze, soon after in the western suburbs of the ancient capital The animals emerged from holes in dwellings, jumped up, turned round, and fell dead Baskets and boxes filled with their bodies were cast into the canal Their colour was darker and their tails were shorter than the common rat Here was evidently a subsoil poison, which affected the animals precisely in the same way as the malaria of the Yunnan pest (which extended to higher animals and to man) Happily, the subterranean miasm at Nanking did not affect animals that live above ground, nor did subterranean animals communicate the disease in any way

SOOCHOW (in a lacustrine region, situated south of the Yangtze, on the Grand Canal,—the centre of silk culture, one of the most populous and fertile portions of the globe) —During the preceding summer, owing to alternations of cold winds and excessive heat, agues and bowel complaints raged with violence, children being the chief sufferers It was given out that the God of Pestilence had descended, and people, discarding doctors and drugs, crowded the temples, entirely neglecting treatment

The ill-health of summer extended into autumn, diseases prevailed beyond the capacity of doctors to give due attendance on the sick,—the cause of the maladies being untimely cold winds, with intermissions of extreme heat Ague and diarrhoea were most prevalent and were very fatal, especially among children over 10 years of age, many of whom died the day they were attacked In some cases whole households were prostrate at the same time

YANGCHOW (north of the Yangtze, on the Grand Canal, topographical features like the latter region) —After the summer the heat became more intense, and numerous fatal cases of cholera occurred, but two out of 10 proving curable At the same time a murian prevailed among cattle, horses, pigs, and dogs Similar accounts, except that relative to murian, came from Ningpo and Hangchow, as Shanghai also suffered, it is probable that disease was unusually rife throughout the coasts of Northern Chekiang and Kiangsu

HANKOW, 22nd November —Since October the weather has been preternaturally warm, summer clothing being in request, and mosquitos abounding, consequent on this unseasonable heat, there has been much sickness, but not of a fatal character There was much mortality among hens, they were suddenly seized with fits, expiring at once

JANUARY, FEBRUARY, and MARCH 1882

HANGCHOW (on the Ch'ient'ang river, at the head of a great estuary, where commences the Grand Canal) —It was reported early in February that the winter weather had been characterised by fluctuations of heat and cold, which caused a large amount of inflammatory disease among children, who fell victims to throat maladies, for which there was no remedy, the disorder proving fatal in a few hours (diphtheria?), and at the time of writing, small-pox existed, children being attacked notwithstanding every precaution was taken to keep them in-doors, and by strict dieting. Besides, inoculated persons, between the age of 40 and 50 years, were confined to bed, their faces being covered with pustules, those cases, though severe, were not fatal, recovering in the course of seven days. Doctors said it was due to suppressed wind in the system, and to unseasonable weather,—sudden alternations of heat and cold,—and belonged to the variolous class of disorders—a “water pox” (varicella?). Its existence augurs well for a healthy spring.

SOOCHOW —It was thought that as the summer and autumn were unhealthy, winter would bring an improvement, but intractable diseases still prevail, and now puerperal fever exists, not one in 10 recovering, it has been found incurable. Within a few days several tens have succumbed. Another account states that typhoid fever raged to such an extent, particularly among women, as to cause an increase in the price of woven fabrics.

YANGCHOW —The warmth of last winter indicated, with its snow and rain, a fruitful year, but the cold, or negative principle of nature, being unable to cope with the positive or warm principle, disease became rife, particularly of the throat, among young children, who died a few hours after being attacked,—in utterly inexplicable circumstance.

APRIL, MAY, and JUNE 1882

NANKING —A mild winter and paucity of rain caused an unhealthy spring, the ordinary maladies of the season show a disposition to assume a chronic form, being cured with difficulty.

NANCHANG (on the southern shore of Poyang Lake), May —The very changeable weather during the past season—unseasonable rain and sunshine, heat and cold alternately prevailing, followed by a furious storm, brought a degree of cold that caused extensive sickness, although not of a fatal character, yet it was cured with difficulty. The disorder resembled ague, but ague it was not, one day the patient would be better, and the next day worse,—a somewhat peculiar malady, and one to be guarded against. This region has also suffered from a pig murrain. Those who ate the flesh were attacked with boils.

CANTON, 10th May —This province has suffered from want of rain, causing a loss of half the crops in some districts. There was much sickness, children being the chief sufferers. A rainfall abated the evil.

JULY, AUGUST, and SEPTEMBER 1882

YANGCHOW —In July this city and the adjacent region were revisited by cholera. In the year before, 40,000 fell victims, and now the epidemic is raging with greater violence than at that time. On that occasion the disease came from the north and went south. This year its course has been reversed, it approached from the south, travelled northward, the choleric wave reached Tientsin and Peking in a mild form. A month later this unfortunate region was visited by three types of disease. The first chiefly affected men, it was caused by cold wind suppressing the summer's heat, inducing fever, which became irregular, some cases experiencing a change between the seventh and tenth days, when the heat gradually subsided, and the patients recovered, others, changing between the third and fifth days, presented petechiæ over the entire body, and succumbed. The second form of the epidemic appeared chiefly in women, who first suffered from chills, followed by fever, which did not subside, it was attended with a dry mouth. Cooling remedies were of no avail. Only two or three out of 10 survived. Thirdly, children suffered

from fever, followed by cold, while the whole face broke out into blotches, as in measles, when the eruption came out distinctly the patient took a favourable turn, otherwise the disease changed to a throat locking malady, and terminated fatally

CANTON, 1st August—An epidemic has suddenly appeared in this city which makes its first attack by an excessive thirst and profuse perspiration, afterwards there is a flow of saliva, then the tongue retracts, and the patient dies of suffocation. Doctors direct that in such cases heated laid should be dropped on the tongue, to restore it to position

HANKOW (on the left bank of the Yangtze, at the embogue of the Han river)—Native doctors report the existence of diarrhoea in the autumn, which when not treated at its commencement becomes intractable. Agues were uncommonly frequent at the same time, and in the cases of the crews of junks that had conveyed rice to Shantung in the spring, it was often fatal. These men returned from their voyage with diarrhoea, the water and food of Shantung not agreeing with them, and hence the ague proved too much for them

SOOCHOW—This city also suffered from a virulent form of cholera. It was preceded by agues and diarrhoeas, these last assumed a chronic form

NINGPO—At the close of summer there was a cattle murrain at Ningpo, in consequence of the heat, it extended to horses, dogs and goats. An epidemic affecting domestic animals generally, such as this, is an unusual occurrence. Cows and buffaloes died after having two or three watery stools, their illness being of a few hours duration. The year 1878 was remarkable for the virulence of this disease, exceeding what living men had before known,—80 per cent of the cattle perishing. It was not a new disease, but one well known, only appearing at that time with greater intensity. Since then the disease has appeared each autumn

The mountains to the south of Ningpo, in Fêng-hua and T'ai-chou, appear to be the habitat of a microbe (*Bacillus anthracis*?), the organism of the splenic disease in cattle, from which that region is seldom free. The equine disease that prevailed simultaneously was probably glanders, ponies at Shanghai suffered from that malady about the same time. Concerning the canine epidemic, information is yet more meagre. The animals were suddenly seized with tumours, and speedily died, somewhat as dogs in China are known to perish when their hearts become clogged with filaria. Ningpo seems to suffer from an undue proportion of rabies, no year passes without the occurrence of several fatal cases of hydrophobia

NORTHERN FORMOSA—A detachment of troops from Hunan posted in Northern Formosa all suffered from fever, the type is not reported, only that it was of a fatal character. It has been found that men from the interior of China are less easily acclimatised than those from the adjacent coast. Excessive rains at this period, and the employment of the soldiers as road makers, contributed to render them more susceptible to disease, and the absence of suitable medical attendance served to increase the disaster

Dr B S RINGER's Report on the Health of Amoy for the Half-year
ended 30th September 1882

DURING the past summer the health of the foreign community was fairly good, and the port was singularly free from epidemic disease. Six births and two deaths have to be reported.

One death occurred on board a steamer outside the harbour, in the person of an engineer who shot himself with a revolver while alone in his cabin. The steamer put into Amoy, and the body was brought on shore, where a postmortem and inquest were held. The examination showed that the pistol had been fired into the mouth, the bullet shattering the orbital plate of the superior maxilla, the lateral plate of the ethmoid, and the lesser wing of the sphenoid, and lacerating the anterior portion of the left cerebral hemisphere. It was found lodged in the substance of the brain, just beneath the dura mater.

The second case was caused by drowning, and happened to a little girl, the daughter of a captain of one of the sailing vessels in the harbour, during a collision, in a heavy gale. The child fell overboard, and could not be recovered at the time. The body was washed on shore several days later, and identified.

Of the births, one was premature, the infant still-born, at six months.

In the early part of the summer a case of chronic quotidian fever, attended by some unusual and interesting symptoms, was treated.

The patient was a visitor, and had for several years resided in North Formosa, where, not long after his arrival, he contracted a malarious fever, which troubled him, on and off, ever since, the least exposure to sun or wet frequently bringing on an attack.

During the summer of last year the patient suffered severely from boils, which were sometimes so serious as to confine him to bed for several days. In the winter of the same year he caught a violent cold, which terminated in bronchitis and asthma, and lasted until the spring, when, again, his old enemy, quotidian fever, returned with great violence, the bodily temperature reaching on one occasion, in the evening, $106^{\circ}4$. Next morning it had fallen to $99^{\circ}4$, and frequently, after a very high evening reading, the temperature was found in the morning to be almost 1° below normal. After continuing for three weeks, the patient was advised to leave Formosa, which he did, and arrived in Amoy on 24th May.

On examination, no enlargement of spleen or liver was observed, but several indolent, elastic swellings were found. Of these, the worst were situated one over each buttock, and were so extremely painful that the patient was unable to lie on his back. After careful examination, I came to the conclusion that the swellings were collections of pus. After consultation with my colleagues, Drs McLEISH and McDougall, I proceeded to aspirate one, from which I drew off several ounces of purulent pus. During the next 10 weeks, between 35 and 40 ounces of pus were drawn off from five separate collections. Those in the buttocks were very deeply seated, the point of the aspirating needle in one instance touching the surface of the bone before the matter was reached. A steady course of quinine, in 4-grain doses, was administered with much benefit, and the patient left for Japan early in July. He returned at the end of September free from fever and without any sign of further purulent deposit.

The question arises as to the cause of these purulent collections. Were they an effort of nature to cast off some effete material from the system, consequent upon the malarious

poisoning, analogous to the crops of boils which frequently follow severe cases, or were they due to some blood-poisoning, irrespective of the febrile condition?

Several obstinate cases of diarrhoea, with dysenteric symptoms, occurred, but eventually yielded to treatment. In such cases I find the exhibition of astringent enemata, such as acetate of lead and opium, most valuable. These enemata should be small, not exceeding from 2 to 4 ounces. These, if slowly introduced, are readily retained for hours, and exert the most comforting influence upon the irritated intestine. They may be repeated once or twice daily, according to circumstances. At the beginning of this Report I remarked upon the freedom of Amoy from epidemics. This is the more surprising seeing that in Manila cholera has been raging for some time, and that there is direct steam communication between Manila and this port. Previous to the quarantine regulations, which were afterwards carefully enforced, many hundreds of Chinese passengers were landed here, two of whom died of cholera shortly after arrival. Several other deaths were reported to me in the immediate vicinity of the inn where the above cases occurred, and I anxiously inquired during the next few weeks for any further mortality, but though a few cases were from time to time reported, the disease did not spread, and thus the city of Amoy escaped an epidemic. This, I think, was partly due to the fact that the passengers brought from Manila were for the most part non-residents in Amoy, and probably left the town without delay.

It would be well if lay residents could be brought to understand that an outbreak of cholera may commence slowly and insidiously, that cases may at first be few and far between, and that still a town may be in imminent danger of a severe epidemic without necessarily a sudden and sensational death rate occurring. This knowledge might to some extent prevent the apparent surprise caused by the refusal of health certificates and the adoption of other sanitary measures necessary under such circumstances, and pursued by those in a position to form an opinion in the matter.

Dr McDougall, in charge of the Kulangsu Hospital, has supplied the following notes of a case of suicide, which probably terminated somewhat more slowly than was originally intended —

NG KIN, aged 17, a bought female servant, belonging to a Chinese merchant in Amoy, attempted to commit suicide by swallowing 1 ounce of caustic alkali on the 18th April last. Almost immediately after taking this poison she was seized with a violent attack of vomiting, the vomited matter containing a good deal of blood. On the 21st April she was admitted into Kulangsu Hospital, very weak and pale, eyes sunken, and lips, tongue, palate and uvula covered with sloughs. The unsuccessful attempts which she made to swallow caused her great pain, and were followed for some time by violent retching. There was much tenderness on pressure over the abdomen, especially the region of the stomach, and also over the throat. Her skin was dry and hot, pulse 120, and very feeble, temperature, 99° F, and expression very anxious.

Finding that the process of deglutition was quite impossible, she was given frequent nutrient enemata, amounting in the day to 50 or 60 ounces of beef-tee, eggs and milk, to which, when much pain was complained of, laudanum was added in small quantity. Sleeplessness was treated by subcutaneous injections of morphia of from $\frac{1}{4}$ to $\frac{1}{2}$ grain. During the time she was in hospital she slowly and steadily improved as regarded the circulation and general condition. The sloughs on the lips, tongue, etc., gradually separated, leaving clean ulcers, which quickly healed under a chlorate of potash mouth-wash.

The nutrient enemata, which were retained for three or four hours, were continued all the time she was in the hospital. The temperature occasionally rose to 101° , but the administration of 10 grains of sulphate of quinine in one of the enemata soon brought it down to 99° again. After the mouth and throat got well, the patient made frequent attempts at deglutition, but without success. Many unsuccessful efforts were made to pass bougies down the oesophagus, till at last, on the 2nd June, a small-sized bougie was passed through one stricture at about the level of the thyroid cartilage, but after passing 6 inches beyond this point, it stopped. Subsequent attempts at getting it lower proved fruitless. Notwithstanding all this, the patient, on the 6th June, for the first time swallowed a little congee and milk. This was followed by great pain in the stomach, which was relieved by the constant application of warm poultices. The quantity was increased every day till, on the 13th June, she swallowed a large tumblerful of beef-tea and the same quantity of milk. It took a long time to get all this down, as the patient could take only a very small quantity at a time. The rectal injections were continued. Improvement was now rapid, but, unfortunately, the girl's master, without any warning, removed her from the hospital on the 14th June. The Chinese house surgeon was sent over to Amoy to ask him why she was taken away, and to impress upon him the desirability of it once allowing her to return. His reply was that she had gone into the country, and would soon be all right. Four weeks after this, news came of her death. Particulars as to the symptoms preceding death could not be obtained. It is most probable that the cessation of nourishing enemata, and the absence of any sufficiently nourishing food that she could swallow, simply brought on death by starvation.

It is worthy of note that this patient lived for 49 days without swallowing the smallest quantity of food, either fluid or solid, and that, in spite of this, she derived so much nourishment from the enemata that she actually gained in weight.

Dr J F WALES's Report on the Health of Canton for the Half-year
ended 30th September 1882

OLD residents here consider that the summer just now terminating has been an unusually trying one, owing to the comparative absence of rain in and about Canton, and also to the very severe heat. Notwithstanding this, the health of the foreign community has been very good, and, with the exception of one case of enteric fever and another of long-standing liver disease, there has been no serious sickness here, nor have I heard of any extensive outbreak of disease among the native population in the city.

The chief diseases occurring were fevers,—the majority of which were very mild, lasting only a few days,—diarrhœa, general cases of liver derangement,—but, with one exception, none of serious importance. Cases of boils were numerous and troublesome, but relief was generally experienced from the internal administration of calcium sulphide and the local application of belladonna. During the past half-year there have been two births and one miscarriage, the latter happened during the third month of pregnancy, and was notable for the almost complete absence of hæmorrhage. Two Chinamen in foreign employ died from hydrophobia. The following are some particulars —

On 8th August, four Chinamen were bitten by a young dog, a retriever, which had some days previously exhibited symptoms of distemper. The animal, unfortunately, was at once destroyed, so that accurate information as to its precise condition was not obtainable. One man had a portion of his finger cleanly removed, and, in consequence, lost a large quantity of blood. Another had a slight abrasion on his leg, but his clothes were not perforated. The two unfortunate men whose injuries terminated fatally had lacerated wounds on the fingers. It was not until several hours after the injuries had been received that I first saw the men, and then I at once freely applied nitric acid. Afterwards, all the wounds healed kindly under water dressing. On the morning of 22nd September I was summoned to visit one of the men, a watchman in the Customs. He had taken ill on the previous day with rigors accompanied by great prostration. When I saw him he was dying from slow asphyxia, the effect of spasm of the respiratory muscles, his mouth was filled with frothy fluid, which he frequently attempted to get rid of by spitting. He had frequent and severe convulsive seizures, and was unable to swallow anything, evincing much horror when a stimulant was offered him.

The other patient was a policeman employed by the Shamien Municipal Council. He was very apprehensive from the time he was bitten. When the wound healed he returned to his duty, but after a short time began to complain of pain in the region of the heart. The death of the other man had a very disastrous effect on him, for he quickly gave up work, took to his bed, and called in three Chinese medical men, who promptly took his case in hand, and proceeded to treat him vigorously. On 26th September I was asked to visit him, he was in bed, and every few minutes was seized with strong convulsions, which had first commenced early that morning, and which the slightest cause sufficed to excite, such as a noise or a slight current of air produced by a person moving in the room. He was perfectly sensible, and was both able and willing to take fluid into the mouth, but was altogether unable to swallow, owing to the spasm which the attempt excited. He died late the same evening from exhaustion, the result of frequent convulsions.

I was most anxious to try the effects of subcutaneous injections of curare, but was unable to do so in either case, as the patients were surrounded by excited relatives, and were

under the care of Chinese doctors I may remark that in both cases I carefully looked for the presence of vesicles or pustules near the fœnum of the tongue, which are described by Dr MAROCHETTI as existing at an early period of the disease, but in neither case was I able to discover anything of the sort. At a later period I found that the sub-maxillary and sub-lingual glands were enlarged, and the small buisæ which normally exist in the loose areolar tissue under the tongue were very prominent.

Mr GUNTHER, Harbour Master, has furnished the following abstract from the meteorological tables for the half-year ended 30th September 1882 —

ABSTRACT from the CUSTOMS METEOROLOGICAL TABLES from April to September 1882

MONTH	WINDS							WEATHER			BAROMETER				THERMOMETER			
	No of Days N to E	No of Days E to S	No of Days S to W	No of Days W to N	No of Days Variable	No of Days Calm	Average Hourly Force	No of Days Fog	No of Days Rain	Rainfall in Inches	DAY		NIGHT		DAY		NIGHT	
											Highest Reading and Average Highest	Lowest Reading and Average Lowest	Highest Reading and Average Highest	Lowest Reading and Average Lowest	Highest Reading and Average Highest	Lowest Reading and Average Lowest	Highest Reading and Average Highest	Lowest Reading and Average Lowest
1882						miles				Inches	Inches	Inches	Inches	°	°	°	°	
April	8	12	2		8		6.6		7	4.3	{ 30.01 30.18	29.90 29.80	29.99 30.18	29.94 29.75	77 89	69 55	72 83	69 55
May	2	14	7		8		5.9		18	17.4	{ 29.91 30.04	29.84 29.64	29.90 30.00	29.86 29.73	85 90	79 72	80 85	77 71
June	1	20	1		8		6.1		17	6.0	{ 29.83 29.91	29.78 29.60	29.82 29.91	29.81 29.70	87 91	82 77	83 87	81 75
July	2	15	8	2	4		6.8		15	11.1	{ 29.97 29.79	29.55 29.75	29.94 29.78	29.55 29.76	97 89	79 83	90 84	79 82
August	4	16	6	2	3		5.56		12	5.9	{ 29.99 29.80	29.51 29.74	29.96 29.79	29.50 29.77	95 90	78 82	92 84	77 81
September	12	13	5				5.54		8	3.9	{ 30.04 29.94	29.67 29.88	29.99 29.91	29.71 29.89	94 89	78 83	89 84	72 81

REMARKS —During April, rain fell on 7 days, measuring 4.3 inches, against 20 days, measuring 11 inches, in the corresponding month of last year. During May, rain fell on 18 days, measuring 17.4 inches, against 14 days, measuring 7.3 inches, in the corresponding month of last year. During June, rain fell on 17 days, measuring 6 inches, against 12 days, measuring 5.5 inches, in the corresponding month of last year. During July, rain fell on 15 days, measuring 11.1 inches, against 18 days, measuring 8.11 inches, in the corresponding month of last year. During August, rain fell on 12 days, measuring 5.9 inches, against 19 days, measuring 9.7 inches, in the corresponding month of last year. During September, rain fell on 8 days, measuring 3.9 inches, against 8 days, measuring 2.5 inches, in the corresponding month of last year.

During April, the prevailing winds were from the S E, the strongest on the 26th, which averaged 15 miles per hour during the 24 hours. During May, the prevailing winds were from the S E, the strongest on the 1st, which averaged 8 miles per hour during the 24 hours. During June, the prevailing winds from the S E, the strongest on the 1st, which averaged 9.2 miles per hour during the 24 hours. During July, the prevailing winds were from the S E. High winds were experienced on the 17th and 18th, the weather looked bad and threatening, and fears of a typhoon were entertained, average force per hour for 24 hours, nearly 15 miles (on the 18th). During August, the prevailing winds were from the S E, the strongest on the 12th, when the velocity averaged 11 miles per hour for 24 hours. During September, the prevailing winds were from the N E, the greatest force was noted on the 4th inst, when the average velocity was 10 miles per hour for 24 hours.

Dr J H LOWRY'S Report on the Health of Pakhoi for the Half-year
ended 30th September 1882

IN presenting the first Medical Report from Pakhoi, dealing with the six months just ended, it is very gratifying to be able to furnish almost a blank return of sickness so far as the foreign community are concerned. The season has been a fine one, the extremes of heat not being so great as in former years. The rains proper have been of a very limited character, lasting only during the first two weeks of August. In the interest of the public health I have during the past six months carefully weighed the advantages and disadvantages of this place as a residence. It is not exactly within the sphere of a medical report to enter into a lengthened description of a place, or give a history of its antiquity. It will, however, be necessary for me to mention a few brief details before speaking of the health of the district. The town is situated close to the sea, stretching from west to east, away from it. Forty feet above the sea level there is a fine plain extending for miles in a south-easterly and south-westerly direction. It is by no means bare or uninteresting, for here and there, studded over it, are clumps of bamboo and fir, and to the west there is a low range of hills skirting the sea. The town itself, from its filthy condition, is not only totally unfit for Europeans to live in, but is positively dangerous, as poisonous gases are being constantly evolved. On the other hand, it is questionable whether there are many places in China so suitable for residence as is the plain, which combines all the advantages of the country and of the seaside. The air is free from the abominable contaminations of the town, a pleasant breeze constantly blows, affording cool nights, and therefore refreshing sleep. There is no malaria, and those who have suffered from its effects elsewhere seem gradually to get rid of it after a residence here. The drinking water I find to be good. After coming here, I took the earliest opportunity of obtaining samples from the different wells, and subjected them to analysis, with the result that only one was unfit for drinking purposes, the others being pure, or at least free from ascertainable contamination. Sea-bathing can be indulged in with impunity in the evenings. In the present age it is hardly necessary to speak of the advantages of the sea-bath, acting as it does very powerfully on tissue metamorphosis. One of our ablest therapists has said,* "the sea-bath increases the process both of destruction and of construction of tissue, yet that of construction is in excess of that of destruction, with the effect of inducing not only increased vigour of the functions of the body but an actual augmentation of its weight." Walking exercise can be largely indulged in both in the early morning and evening, and those with a taste for natural history will find enough to make their walks interesting. The place is also well suited for the more energetic exercise of riding, which has also a considerable number of votaries, and which serves to keep

* RINGER, *Handbook of Therapeutics*, 9th ed., 1882, p 49

the abdominal organs in good working order during the hot months. To sum up briefly, we have the advantage of cool nights, a day temperature not too high (though the whole summer 90° F has not been registered on the plain), good drinking water, sea-bathing, healthy exercise, and absence of malaria.

I have preserved the following brief notes of a case of acute dysentery. Whatever value they possess is due to the fact of the case being the first that has been carefully observed here.

P. D., æt 48, seen early in the morning, after return from a missionary tour through the country, during which he had suffered from continual looseness of bowels, and had no treatment. Found patient weak and depressed, and complaining of thirst. Temperature normal, pulse, 60, and weak, tongue flabby, dry, coated with slight fur, and indented by teeth. Great pain in both iliac fossæ, especially left, pain also along colon on pressure, no hepatic or splenic enlargement. Stools rosy, frothy, mucous, with slight traces of fæces. Ipecacuanha not being procurable at the moment, a dose of chlorodyne was administered, and a poultice of linseed and mustard applied to abdomen. 10 A.M.—Patient had been quiet, and had a little sleep, one stool. Five grains of compound ipecacuanha powder was administered every six hours, with a diet of broth and milk. Evening—There had been five stools since morning, pulse weak, much pain on pressure in iliac regions, unable to pass water. Administered hot hip-bath, with immediate relief, much urine passed.

Second Day, 9 A.M.—15 stools, containing a good deal of blood, since 2 A.M. Distressing tormina and tenesmus, much pain on pressure in iliac fossæ. Pulse very weak, temperature normal. Ipecacuanha with bicarbonate of soda (5 grains of each) was now given every four hours. Diet—broth, and a little milk at regular intervals. 1 P.M.—Pulse a little stronger, five stools since morning visit. Linseed and mustard to abdomen. Evening—Patient has been constantly to stool, tenesmus very great. Temperature normal, pulse weak. Enema of 30 minims of laudanum in an ounce of starch mucilage, which was retained for only a short time. 11 P.M.—20 grains of ipecacuanha were administered.

Third Day, 9 A.M.—Not been to stool so often, but no accurate record of frequency, tenesmus persisting. Temperature, 100°, pulse, 60, a little stronger. Enema of starch and opium repeated. Diet as before. 1 P.M.—Ipecacuanha and soda every four hours. Evening—11 stools since 1 P.M. Temperature, 100° 8, pulse unchanged in character. Repeated enema, and gave 5 grains of quinine, which latter was repeated after four hours.

Fourth Day, 9 A.M.—Patient better, five stools since 1 A.M., has slept, tongue better, pulse small, temperature, 100°, powders and nourishment continued. 1 P.M.—Two stools. Evening—Temperature, 100°. Three stools. Enema and quinine repeated.

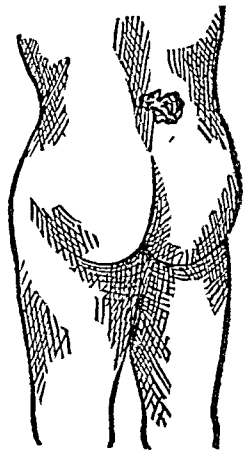
Fifth Day, 9 A.M.—Patient much improved, one stool since midnight. Temperature, 100°, pulse, 60. Evening—Temperature, 100° 8. Gave 5 grains of quinine every four hours. Complains of flatulence.

Sixth Day, 9 A.M.—Patient has slept, one slight stool containing fæcal matter. Temperature, 99° 8. Evening—Temperature, 98° 8. Patient made a good recovery.

Health of the Natives—Considering the horrible condition of the town, it is surprising that there should be any healthy natives in the place. Diseases of various kinds are rare enough, and the people are miserably unhealthy-looking, great numbers suffering from scrofula, which shows itself widely in enlarged glands of the neck, disease of the bones, and scaly skin affections. Phthisis is also not uncommon, and many cases of syphilis in its tertiary

forms have come under my notice. During the hotter months, both adults and children seemed seldom free from obstinate crops of boils both on the body and scalp. To speak of the sanitary condition of this town is almost unnecessary, as, presumably, it is not different from other Chinese towns, but according to our Western ideas of sanitary laws, it seems hardly conceivable how human beings can live among such filthy surroundings. In the streets, not the slightest attempt at cleanliness is made, animal and vegetable substances lie decomposing on every side, while the privies are open, and placed in the most frequented parts. The houses themselves are little better than the streets, and during the spring I had an opportunity of being in a large number and noting their condition. In some, an open gutter of no depth runs through the house, into which every abomination finds its way, and as these drains are seldom flooded or cleaned, the stench is vile, while the floors are saturated with excrement. In spring, when the temperature begins to rise after a dry winter, such as last winter was, a very sickly period occurs among these unfortunate people, due, doubtless, to the increased temperature acting on the soil. There being as yet no dispensary here, any attempt at systematic observation or treatment counts failure, but I feel confident that there is a large field for research, and I trust at some future time to record more than I can on this occasion. I take the following case from my note-book —

Epitheliomatous Sore on Buttock — LIN P'INGSHIH, æt 45, merchant, came under my notice in May. He stated that he had been suffering since July 1881, and that previous to that he had been in perfect health. Family history good, none of his relatives had ever suffered from anything similar. During April the sore became worse, and he suffered much pain, especially at night, and he has been losing flesh, and complains of weakness. Patient I found to be a fairly nourished man, not an opium-smoker. The skin to the right of the sacral region was the seat of an unhealthy-looking, irregular ulcer, in size about that of a small oyster shell. The edges were thickened and elevated, parts of its surface were dry, and where there was discharge it was thin and watery, its peculiar situation made its classification for a time uncertain, but its subsequent course and the microscope proved it to be epithelioma. Various caustics and lotions were tried with little or no improvement. In July, when on a short visit here, Dr PICHON of Shanghai saw the case, and concurred with me on the advisability of operative measures being taken, to which the patient has not yet consented, and he has passed back to Chinese hands. The case was more suitable for the thermo-cautère than for the knife.



The sketch in the margin gives some idea of the situation of the ulcer.

The other cases in my note-book are not of sufficient interest to merit publication. A large number of eye cases have come under my notice, many with eyes hopelessly destroyed from neglect. The sufferers willingly submit to treatment, and there is a large field for ophthalmic work.

The following plants of some pharmaceutical value are found in this district, and have been enumerated for me by Mr G M H PLAYFAIR — *Abrus precatorius*, *Artemisia*, *Racinus communis*, *Iolanum dulcamara*, *Pimpinella anisum*.

I herewith append my own meteorological readings for the six months ended 30th September, taken on the plain, 40 feet above sea level —

MONTH	THERMOMETER						Days on which Run fell
	Highest by Day	Lowest by Day	Highest by Night	Lowest by Night	Average Day	Average Night	
	° F	° F	° F	° F	° F	° F	
April	85	50	84	49	76	70	4
May	89	71	87	72	87	77	4
June	88	79	83	76	88	74	8
July	89	75	86	76	86	79	12
August	89	71	82	72	83	77	15
September	88	76	85	73	85	75	10

REMARKS —No violent storms or typhoons occurred

NOTES ON AN EPIDEMIC DISEASE OBSERVED AT PAKHOI IN 1882

By J H LOWRY, L R C P Ed , L R C S Ed

DURING last spring I had an opportunity of observing an outbreak of a very fatal disease which prevailed among the natives of this district. This disease is known locally as *luen-tzŭ* (瘧子), and after seeing a number of cases, I have been able to come to no other conclusion than that the disease is at least closely allied to bubonic plague. Little, I believe, had been observed of this malady in China until M^r ROCHER, of the Customs Service, published, in his *Province chinoise du Yunnan*, the description of a disease resembling plague, which he observed while travelling in that province. The disease which M^r ROCHER saw was undoubtedly plague,—locally called *yang-tzŭ* (痒子). He tells us that during the years 1871–73 its ravages were great through Yunnan, he also learned that the disease was imported from Burma, but there appears to be no reliable information as to the exact date of its introduction. There is, however, sufficient evidence that it has existed in the province since the Rebellion. M^r ROCHER speaks of the mortality among the rats, they being first attacked, buffaloes, oxen, sheep, deer, pigs, and dogs also suffered,—the latter, he says, less severely. The symptoms in man are slight fever, rapidly increasing, intense thirst, then dark red swellings show themselves in the armpits, groins or neck, fever continuing to increase, patient becomes unconscious, bubo increasing till second day, after which remains stationary, when full size, about as large as a hen's or goose's egg, then consciousness returns, but still great danger, for if the swelling up to this point has been hard, and becomes soft, the fever continuing, the case is considered hopeless. If the tumour open externally, there is a chance of recovery. Some Chinese physicians have attempted to cut these tumours, but few survived the treatment, as a last resource they give large doses of musk. Such is the information M^r ROCHER obtained in Yunnan. Subsequently, Mr BABER, of H B M's Consular Service, in his *Notes on Route of M^r GROSVENOR'S Mission through Western Yunnan*, speaks of plague. He says its approach is indicated by the eruption of one or more minute red pustules, generally in the armpits, but occasionally in other glandular regions. If several pustules appear, the disease is not considered so hopeless as when these are few. The sufferer is soon seized with extreme weakness, followed in a few hours by agonising aches in every part of the body, delirium shortly ensues, and in nine cases out of ten the result is fatal. It often happens that the patient suddenly, to all appearance, recovers, leaves his bed, and affirms that, beyond a slight sensation of weakness, he feels thoroughly convalescent. This is invariably a fatal sign, in about two hours the aches return, and the sufferer dies. He also refers to the mortality among rats, and poultry, pigs, goats, ponies, and oxen have died. Mr BABER seems to have obtained most of his information from a French priest, who, being an old resident in the stricken districts, should have ample

opportunity of noting the character of the disease, and it is likely his general observations are correct. Mr BABER was fortunate in meeting a native—Governor TS'ÊN—who had been twice attacked by the disease, his second attack was milder than the first. The disease which appears in this district does not seem to spread any great distance, as I have been unable to find evidence of its existing in any other part of the Kwangtung province, nor in the neighbouring province of Kwangsi. The existence or extinction of the disease commonly called plague is of interest not only to epidemiologists, but to the members of every community. In India, I learn, it has not appeared for many years. In Sind its ravages were great from 1815 to 1819, in Narwái, in 1836, Kumáon, 1846, and again in 1852. There it appeared as a fever of a typhus character, accompanied by external glandular tumours, it was very fatal, death taking place in three or four days. It was not contagious, but infectious, the swellings were in a state of incomplete inflammation and suppuration. In many cases death took place in 24–36 hours, there was little fever or other excitement. It was preceded or accompanied by a great mortality among rats, no other animals were affected. It occurred as high as 10,000 feet above the sea level, and with a low temperature, and again in the villages, during May, with a house temperature of 95° F. Recently notices have appeared in the *Lancet* announcing rumoured outbreaks of plague in Persia. It was said to have broken out at a village called So-uj Bolak when there was 35° of frost, it was also rumoured to have occurred at Yazistan. Dr ARNAUD, of Teheran, reports its having occurred last spring at Ouzoundéré, not far from the borders of Turkish Armenia, and close to the highway which leads through the defiles of Soleymanie from Turkey into Persia. Out of 524 inhabitants, 259 were attacked, and 155 had died, the duration of the malady being from one to seven days. Dr ARNAUD calls it, in his report, bubonic plague, and says 37 of the persons who had recovered still had large buboes on their necks and under the armpits, while others were marked with indurated anthrax. The inhabitants of the village had been camped out and isolated, the whole of the houses being razed, and this energetic action had the effect of preventing further spread of the malady. In ZIEMSEN'S last volume, some interesting statistics of the Hillah plague of 1876 are given. 1,826 cases were recorded, of which 277 were under 10 years, 617 at 10–20, 432 at 20–30, 292 at 30–40, 123 aged 40 to 50, and 82 at more advanced ages. 889 were males, and 937 females, 865 recovered, 961 died, 710 had groin gland suppurations or swellings, 466, axillary glands swollen, 98, the neck, and 122, glands elsewhere, 36 had carbuncles, 28 had coma, 9, convulsions, 120, petechiæ, 2, epistaxis, 6, hæmoptysis, 27, hæmatemesis, 14, bloody diarrhœa, 2, menorrhagia, 32, bilious vomiting, 16, bilious diarrhœa, and 2, jaundice. The treatment, he says, was only expectant.

The epidemic which I have observed in this district does not seem to be an old disease, as it occurred for the first time about 15 years ago, and since that has occurred at certain intervals, the last severe outbreak being in 1877. I am told, however, that a few cases occur every year, but my short residence has not yet given me an opportunity of verifying this statement.

The outbreak of last spring commenced at the end of March, and continued its ravages with lessening severity till the end of June, when it entirely disappeared, while at Lien-chou, a city distant 12 miles from this, it raged with more or less severity till August. The

winter here had been a very dry one, with many strong blows from the north. Towards the middle of March the temperature began to rise, and then, during the first 10 days of April, we had some rain and the atmosphere was laden with moisture, from this on, the temperature gradually rose, and by the end of April we had a day temperature of 85°, and a night one of 76° F. The disease proved to be most fatal and most severe from the middle of April to the middle of May. To form any definite estimate of the mortality is no easy matter, since no official record is kept, but I roughly estimate that between 400 and 500 persons died,—and the population of the town and junk community is put down at 25,000. I make my estimate from what I saw and noted at the time. During the worst weeks of the epidemic, the average deaths were 10 a day. At the commencement of the outbreak the people were almost panic-stricken, many quitted their homes, and sought refuge in the villages away from the town. I can never forget the extreme anxiety shown in the faces of friends of the sick who came to fetch me, how the crowd kept painful silence during the time I held the thermometer in position while taking the body heat, they evidently thinking it had some power of charming the sickness away.

In my Report for the April-September half-year,* I made some reference to the insanitary condition of the town, and, perhaps, before treating of the disease under review, it would be better to repeat what I before said concerning the condition of the houses in which the sick were

To begin with, the streets are in an abominable condition of filth. Not the slightest attempt at cleanliness is tried, animal and vegetable substances lie decomposing on every side, the most noxious gases being constantly given off. The privies are open, and placed, for convenience, in the most frequented parts. The houses themselves are no improvement on the streets, and anyone visiting those of the sick will not soon forget the odour perceived on entering the place. Every house was damp and foul, and along the floors of most of them I found small open gutters, emptying themselves into the street. Into these every household abomination found its way, and as they are seldom cleaned or flooded, it is not surprising there is sickness. The floors are damp, and can be nothing but excrement sodden, under them I found small drains at no distance from the surface, some passing along and emptying into the streets, while the remainder pass under the streets and under the houses on the other side, until they eventually reach the sea. The houses and streets of this town run parallel with each other, the highest street being 20-30 feet above the sea, while the lowest is close to the water's edge, consequently, in a dry season, an enormous amount of excrementitious matter lies fermenting under the floors,—and it is only when heavy rain comes that the place gets cleansed. In nearly every house where the disease broke out, the rats had been coming out of their holes and dying on the floors. I took the opportunity of dissecting several of the rats, selecting those that had just died. Opening the chests first, I could find nothing beyond slight congestion of the lungs. In the abdomen, all the organs were congested, the intestines much distended with gas, the stomachs contained nothing but a little sand, and it appeared as if some time had elapsed since food was digested, all were in more or less the same condition. In two the liver appeared enlarged, the blood

* *Ante*, p. 28

was dark in colour. Examination under the microscope revealed nothing. No other animals were attacked.

I select 10 from the cases that came under my notice, and in the notes appended it will be seen there is some slight difference in the symptoms of each.

Case I—A male child, *æt* 8, was seen on 19th April, he was lying on the floor of a dark, empty room, which had a damp, unhealthy odour. The child, I found on examination, was feverish and restless, and was very thin for a child of his years. At the angle of the left lower jaw I found a roundish swelling, about the size of an ordinary hen's egg. It was hard, and very painful on being touched. There was no fluctuation, and the swelling was movable. On removing the Chinese medicine smeared over it, I could find no discolouration beyond a slight red blush. The whole body I examined carefully, and could find no other enlargements, nor any eruption or petechiæ. Tongue furred, papillæ projecting, slight sordes on lips. Temperature in axilla, $101^{\circ}4$ F, pulse weak and thready, child too restless to permit me to count the pulsations. Lower extremities felt cold. 20th April—Patient seen early, little change from previous day, beyond there being a small swelling, about the size of a marble, in front of the left ear, or, more correctly, it was a swelling of the superficial parotid lymphatics. It was hard, but did not appear very painful. Temperature, 101° , pulse weak and thready. One motion of bowels since previous visit, just before my arrival, it was of a bright yellow colour, and very fetid odour. Patient seemed drowsy, but became very restless on being touched. He died during the afternoon.

A coolie, *æt* 16, who came for me to see this case, took ill on the afternoon of the 20th, and died before morning. I did not see him, but he was said to have had an enlargement in his groin. I noticed he was very much excited about my going to see his master's son, and it is probable he felt sick a day before he gave up. In this house, rats had been coming out of their holes for some time, and dying on the floors almost at once.

Case II—Another male child, *æt* about 10 years, was seen on 19th April, he had only arrived the previous evening from Lien chow, when he left there he was not complaining of sickness. I found patient lying in his mother's arms, in more or less prostrate condition, with heavy expression and drooping eyelids, at times he appeared to get very restless. On examination, I found in the right groin a hard enlargement, about the size of a large betel-nut. It was very painful on being touched, but there was no fluctuation. The glands on each side of it were somewhat enlarged, and those in the left groin slightly swollen. On the dorsal aspect of the right foot there was a small sore, which patient was said to have had some time. Rest of body examined, no other enlargements, no eruption. Tongue examined with difficulty, as patient kept his jaws tightly clenched, it was covered with dry fur, with papillæ projecting, sordes on lips. Temperature in axilla, 106° , pulse, 100, fairly strong. There had been two loose motions of bowels, but they were not seen,—said to have had very bad odour, urine high coloured, very little been voided. Has vomited a little several times, and complains of thirst. Patient seen on morning of 20th, no change, seems more prostrate, gets very excited on being touched, complains of pain in the groin. Bowels opened once since last night's visit, vomited twice. Temperature in axilla, $104^{\circ}4$. Pupils distinctly contracted. Patient died early on the morning of the 21st. Ill 48 hours.

Case III was a man, *æt* 25, who had been sick three days previous to my seeing him. He was in bed, but not suffering from much prostration, as he was able to sit up and move about with the greatest ease. His expression was heavy, and his whole skin was moist and had a very yellow hue. In his left groin there was a small hard swelling, about the size of a large betel-nut, very painful on being touched, no fluctuation, glands on either side of swelling enlarged. Glands in right groin hard and enlarged. No other enlargements over body, no eruption. Tongue covered with brown fur, patient has been vomiting a yellow fluid, no diarrhoea, complains of headache and pain in lumbar region. Temperature in axilla, $102^{\circ}8$, pulse, 100, weak. 22nd April—Patient's strength seems to keep up, and he imagines

himself much better. No change in bubo, still hard and painful, no further enlargements. Bowels opened twice, complains still of lumbar pain, constant running from nose. Temperature, $103^{\circ}8$, pulse, 70, weak. At the nape of the neck I found a rather extensive petechial ecchymosis, this was not visible at previous visit. 23rd April—Before I saw patient, he was dead. Thinking he was better, he got up and went out, only getting a few steps from his own door, fell down, and expired, probably from syncope.

Case IV (seen on 22nd April)—A young man, about 20, took ill previous morning, and when I saw him he was in the wildest delirium, and it was with great difficulty I examined him, skin hot and dry, breath foul, has been vomiting, no diarrhoea. Temperature, $104^{\circ}6$,—probably higher, patient too restless to retain thermometer long, pulse not counted. Whole body examined, and in the right groin I found a diffuse swelling, about the size of a hen's egg, it was softer than previous cases, but I failed to make out fluctuation, it did not appear to cause pain on being touched. Glands of left groin enlarged and hard, no other enlargements over body. 23rd April—Saw patient early, found him quite quiet, all delirium gone, but he had a haggard, prostrate look. Temperature, $104^{\circ}8$, pulse small. Skin dry and hot, general sallow hue. Tongue covered with dry fur, sores on lips. Complaints of headache, vomiting stopped, no diarrhoea. Bubo not greatly changed, the swelling having extended a little above Poupart's ligament, where it appeared hard. Glands of left groin unchanged. Patient died in the afternoon. In this house, on my making the usual inquiry whether anyone else was sick, I learned that a child was just recovering, he, too, had an enlargement in the groin, and eventually got well. Rats died in large numbers in this house.

Case V (23rd April)—This patient was an older man, æt about 40, and had been sick four days. There was no evident prostration, as he was sitting up in the bed quite steadily. Patient stated that his sickness came on with a shivering fit, and he afterwards felt hot, and then noticed a swelling in the groin, he complains of headache and pain in the groin, and at times feels very cold, there has been no diarrhoea or vomiting. Expression heavy, skin very sallow. In the left groin there was a hard circumscribed swelling, not larger in size than a good betel-nut, very painful on being touched, no discolouration or sign of suppuration. Glands of right groin not the least enlarged, no enlargements over body, no eruption. Temperature, $101^{\circ}2$, pulse, 60, and weak. 25th—Patient complains of feeling hot, and swelling in groin painful. Still able to sit up without trouble, and does not appear very weak, though still wears heavy expression. Tongue covered with dry white fur. Temperature, $101^{\circ}7$, pulse weak, difficult to count. Swelling in groin unchanged, painful on being handled, no other enlargements found. 26th—Patient expresses himself as feeling better. Tongue cleaner. Temperature, $98^{\circ}9$, pulse a little stronger. Swelling in groin seems smaller, giving idea that it is going to recede, not quite so painful. Patient's condition from this continued variable, the bubo almost receding, and I had hopes this case would pull through, but he eventually died, being three weeks sick.

Case VI—A woman, æt 30, seen on 26th April. Found her in bed, in a very restless condition, and with difficulty examined, at times she was delirious. She complained of great pain in the head, and had been vomiting a good deal, no diarrhoea. Tongue dry, covered with brown fur. Temperature in left axilla, $102^{\circ}8$, pulse weak. Examining, I found in the right axilla a rather large, diffuse, red swelling, extending from the axilla on to the pectoralis muscle, very painful on being touched, but I could not make out fluctuation, though it was evident it would suppurate. No other enlargements found, no eruption. Patient had been ill some days, and died same evening, eight hours after my visit.

Case VII—Also a young woman, seen on 16th April. Had been three days sick. I found patient very ill, skin generally sallow, puffiness under eyelids, and suffering from great prostration. Previous day had severe epistaxis, has been frequently vomiting, and had brought up several small round worms, which I unfortunately did not see, no diarrhoea. Patient complains of pains all over body, and constant pain in left groin. Tongue dry, covered with brown fur. Temperature in axilla, $104^{\circ}2$, pulse small and weak. Every part of body carefully examined, and all I found was slightly enlarged glands in the left groin, no eruption. Patient died following morning.

Case VIII (seen on 5th May)—Patient was a young man, æt about 20, had been sick four days, very prostrate, with all the symptoms of fever. Skin hot and dry, tongue covered with white fur, papillæ projecting. Temperature in axilla, 105° , pulse, 68, small and weak. Patient complains of great oppression over heart. At the nape of the neck I found a large double circumscribed swelling, not unlike what is figured in some of the text-books as a compound ganglion, in the centre of each was a gland. The swelling was hard and painful on being touched. No other enlargements found over body, no eruption. Died same evening.

Case IX (seen same day)—A young man, æt 23, had been sick three days, and had just arrived from Macao, his friends believing he brought the disease with him. Patient very drowsy, dull, and heavy when roused, skin hot and dry, tongue covered with white fur, tip very red. Has vomited once. Temperature in axilla, 106° , pulse, 112. In the right groin there was a hard ovoid swelling, about the size of a hen's egg, very painful on being touched, no suppuration nor discolouration, other regions, no swellings. Patient was placed in a shed at the rear of the house, where he certainly had the advantage of getting more air, and was removed from the filth of the house. 6th May—Patient very drowsy, difficult to rouse. Tongue very dry, lips and teeth covered with sordes. Temperature, $104^{\circ}8$, pulse, 100. No change in bubo, no other enlargements discovered. Patient passed into a comatose condition, and died on 8th, no further symptoms developing.

Case X (seen on 16th May, second day of sickness)—He was a man æt about 40, and I found him lying on the floor in an exposed place,—in fact, almost in the street. By his side was an opium tray, with all the implements, he being a confirmed opium smoker. Patient was very drowsy, and was with difficulty roused, skin hot and dry, tongue dry and red, sordes on lips and teeth, complained much of headache, had vomited several times, no diarrhoea. Temperature in axilla, $106^{\circ}2$, pulse, 100. In right groin there was a hard ovoid swelling, as large as a hen's egg, painful on being touched, no fluctuation. Over the dorsal aspect of the right foot there was a small sore, discharging a little pus. No other enlargements discovered. Heart carefully examined, nothing beyond usual feverish heart discovered. On making the usual inquiry, "Anyone else sick?" I found there was a female child, æt 10, who had been sick some days, suffering from diarrhoea. She was sallow and very drowsy. Skin hot and dry, tongue covered with white fur. Could discover no enlargements over body. 19th May—Patient in a dying condition, all drowsiness gone, clear in mind, though body very weak, thanked me for my trouble, and said it would be over soon. Temperature, $102^{\circ}8$, pulse extremely weak. Lower extremities cold, tongue, brick-red colour, lips and teeth covered with sordes. Bubo in groin unchanged, sore on foot discharging a little more. Patient died following morning. Child still looked sick, though purging considerably abated, skin hot and dry, tongue covered with white fur. Temperature in axilla, $104^{\circ}6$. At the angles of both jaws I found slight, hard enlargements, no eruption or enlargements on trunk. She made a good recovery.

From the above cases it is seen how fatal the disease is. Out of all the cases I saw, only two recovered—the two children I have mentioned. It is necessary to say that I only saw a small proportion of the afflicted. I have tried to gather information concerning the symptoms and conditions of plague elsewhere, that what has been observed in China may be compared with them. I will group first in the order of most constant presence the symptoms in my own cases—

- | | |
|--|--|
| 1 High fever | 3 Sallow hue of skin |
| 2 Glandular swellings or buboes, varying in size from a large betel-nut to a hen's egg, seldom more than one present, hard and painful, do not suppurate, groin most frequent site | 4 Heavy odour from breath |
| | 5 Pulse small and weak. |
| | 6 Bilious vomiting |
| | 7 Most cases great prostration |
| | 8 Tongue varied, mostly dry, white fur |

- | | |
|--|--|
| 9 Sores on teeth and lips | 16 Drowsiness, passing to coma |
| 10 Delirium | 17 The young more frequently attacked |
| 11 Restlessness | 18 Incubation appears short |
| 12 Respiration somewhat hurried | 19 No eruptions were observed |
| 13 Bowels loose, fetid odour, no diarrhoea | 20 Great mortality among rats, no other animals attacked |
| 14 Præcordial oppression | |
| 15 Thirst not intense | |

In Yunnan the symptoms observed were —

- 1 Fever slight,—increasing
- 2 Dark red swellings in groin, axillæ, etc, size about hen's or goose's egg
- 3 Mr BABER was informed that eruptions of minute red pustules appear in the axillæ and other glandular regions. He does not speak of buboes being present at all
- 4 Rats' mortality great, other animals were attacked

In India the symptoms were —

- 1 Slight fever
- 2 Glandular enlargements not essential, some cases rapidly fatal without them
- 3 Suppuration commonly ends in return of health, but not always. Health recovered with recession of buboes
- 4 Occasionally pulmonary hæmorrhage
- 5 Disease varies in intensity
- 6 Prefers women and children
- 7 Extremely fatal, not amenable to treatment
- 8 Muddy look, lustreless eye, white tongue, difficult articulation, præcordial oppression

It naturally occurs to one, after seeing all these cases, to inquire what really is the disease, and what is its cause. I fear I myself have little light to throw on the subject, and no definite theories to put forward.

Beginning with the causation of the disease, I hold—1st, that macerating filth must have much to do with it, and the remarks I have already made as to the condition of the town and houses warrant my statement. 2nd, want of sufficient ventilation, considering the number of human beings that are crowded to sleep in one house, and from fear of thieves the houses are carefully shut up, even on the hottest nights. As for the specific cause, I am not at present prepared to say what the contagium is, but whatever it be, I am inclined to think it is one that requires a certain high temperature to bring it into activity. I have already spoken of the dry winter, and how the floors of the houses must have got sodden with excrementitious matter, but it was not till the temperature began to rise that the disease manifested itself, continuing its march till we had a higher temperature and rain began to fall. The degree of contagiousness of the disease seems variable, for in the houses where I was it did not appear to attack all the members in the sweeping manner we should expect. At the same time it must not be forgotten that many, from fear of contracting the disease, removed, that is, they did not sleep in the houses with the sick. Frequently some one had died before I came to the house, and others may have been taken sick after my attendance ceased. In Case II the boy arrived from a distance, took sick, and died in 48 hours, no one else had been ill in the house, and no one took sick afterwards. There were not many persons in this house, and none were

young The inference I draw is that the boy contracted the disease elsewhere, as he became sick about eight hours after his arrival in Pakhoi From what I have seen I believe the incubation of the disease to be short, but I regret not having any conclusive proof Had anyone else taken ill in the house of Case II, I should have had some clue The disease may, I think, be defined as a specific contagious fever, of short duration, accompanied by glandular swellings, and very fatal There certainly appear slight differences between what I have observed and the descriptions given of plague elsewhere, but in the main they agree It is evident that the cases differ, in my own there were differences, though not very material Cases IV and VI seemed to be of a delirious form, Case IX, comatose, Cases III and V, nervous or excitable Again, there were cases with little or no glandular affection, like Case VII Certainly, none of my cases resemble what Mr BABER speaks about, nor does this latter bear much resemblance to what Mr ROCHER observed The question arises whether plague takes different forms in different parts of Yunnan? Possibly it may, but if it were not for the fatal nature of the disease of which Mr BABER tells us, I should almost say it was "dengue," as there certainly seem points of resemblance to that disease Some cases of small-pox were said to be present during the epidemic here, but none came under my notice, and I cannot believe there were many Of the diseases we are familiar with, the one under review most resembles typhus fever Anyone going to the bedside of a patient would certainly at first think it was that disease he had to deal with

In concluding my remarks, I have only to add that my treatment was various In most of the cases there was little time for anything to act I gave nitro-hydrochloric acid, quinine, large doses of aromatic spirits of ammonia, chlorate of potash, etc To the buboes I tried poultices and lotions, but never felt justified in using the knife For the excessive temperature, tepid sponging was ordered, and I did my utmost to urge upon the people the absolute necessity of giving plenty of nourishment, how far that was carried out is very doubtful, as it would be alien to all Chinese therapeutics The Chinese treatment appears to have been chiefly the administration of one of their "cold medicines" I understand *shêng-ti* (生地), *mai-tung* (麥冬), *huang-lên* (黃連), and *hsuan-shên* (玄參) were given largely A brown paste was put on the buboes, but the physicians acknowledged their treatment to be futile Had all these unfortunate sick been at once removed to healthy ground, with free ventilation, and with systematic administration of both nourishment and medicine, it is possible I might not have to record so many deaths I saw them in their wretched homes, unsurrounded with the care and nursing to which we are accustomed It is possible they attempted to carry out my directions, which to them must have appeared singular, none having come much into contact with foreigners, much less foreign therapeutics Recently I have learned that turpentine and camphor were given with some success in the two Malta plagues, neither drug was tried by me here I much regret not having secured a postmortem, but it could hardly be expected, dealing with people who have such strange superstitions about their dead I have to regret also not having satisfactorily examined the blood under the microscope The dead were quickly buried, and not left exposed, as seems to be the practice in Yunnan

Dr ALEXANDER JAMIESON's Report on the Health of Shanghai for the
Half-year ended 30th September 1882

ABSTRACT of METEOROLOGICAL OBSERVATIONS taken at the Observatory of the Jesuit Mission
at Sicawei, for the Six Months ended 30th September 1882 Latitude, $31^{\circ} 14' 32''$ N
Longitude E of Greenwich, $121^{\circ} 29' 8''$

DATE	Barometer at 32° F	THERMOMETER		Elastic Force of Vapour estimated in Inches of Mercury	Hu- midity, 0-100	Ozone, 0-21	Velocity of Wind per Hour	Mean Direction of Wind	Total Evaporation during Month	Total Rainfall during Month	REMARKS
		Diurnal Mean Temperature in Shade	Extreme Temperature in Shade								
1882	Inch	° F	° F	Inch			Miles		Inch	Inch	
April	Max	30 428 (6)	62 8	80 8 (29)	0 658	93 (11, 26)	21	30 8 (27)			Twelve days rain Maximum velocity of wind in 24 hours 470 1 miles on the 27th, minimum, 114 4, on the 5th Thunderstorms on the 31d, 9th, and 11th Snow on the 4th Magnetic storm on the 17th
	Mean	29 993	56 6		0 374	79	14	9 5			
	Min	29 567 (27)	51 9	35 6 (4)	0 146	59 (15)	7	0 6 (6)	S 73° E	2 541	
	Range	0 861	10 9	45 2	0 512	34	14			3 382	
May	Max	30 106 (5)	73 9	85 1 (29)	0 693	89 (3)	21	38 9 (16)			Twelve days rain Storm on the 15th Maximum velocity of wind in 24 hours, 537 6 miles, on the 15th, minimum, 63 4 miles on the 27th
	Mean	29 840	66 4		0 476	75	13	9 1	S 46° E	3 600	
	Min	29 578 (16)	59 5	49 5 (1)	0 193	54 (5)	7	0 6 (27)		4 379	
	Range	0 528	14 4	35 6	0 500	35	14				
June	Max	30 023 (28)	77 3	90 5 (21)	1 037	92 (17)	18	23 1 (7)			Eighteen days rain Thunderstorms on the 16th and 21st First cicada on the 22nd Maximum velocity of wind in 24 hours 385 miles, on the 7th, minimum, 61 6 on the 26th
	Mean	29 747	72 5		0 676	84	12	7 8	S 53° E	1 835	
	Min	29 483 (23)	68 5	61 2 (11)	0 484	74 (1)	0	0 5 (30)		9 090	
	Range	0 540	8 8	29 3	0 553	18	18				
July	Max	29 957 (10)	82 9	93 9 (18)	1 073	93 (2)	21	24 2 (14)			Eleven days rain Diluvian rain on the 8th, between noon and 4 P M 4 05 inches Maximum velocity of wind in 24 hours 432 5 miles, on the 15th, minimum 87 3 miles, on the 3rd Thunderstorms on the 11th 19th, and 24th
	Mean	29 727	78 3		0 831	86	9	9 8	S 45° E	2 571	
	Min	29 456 (31)	74 5	65 1 (8)	0 583	79 (7)	0	0 6 (21)		10 810	
	Range	0 501	8 4	28 8	0 490	14	21				
Aug	Max	29 985 (31)	83 1	87 6 (2)	1 059	96 (16)	18	25 5 (17)			Sixteen days rain Typhoon near Shanghai, eastward on the 3rd and 4th On the 5th, at 3 35 P M earthquake Maximum velocity of wind in 24 hours, 435 miles, on the 17th, minimum 65 2 miles, on the 25th Thunderstorms on the 15th and 27th
	Mean	29 725	78 1		0 826	86	8	8 2	N 59° E	2 525	
	Min	29 271 (3)	73 8	65 8 (6)	0 575	76 (6)	0	0 0 (7)		8 450	
	Range	0 714	9 3	21 8	0 484	20	18				
Sept	Max	30 194 (27)	79 1	91 0 (5)	1 049	94 (7)	16	21 1 (13)			Sixteen days rain Maximum velocity of wind in 24 hours, 315 4 miles, on the 12th, minimum, 64, on the 26th Thunderstorms on the 1st and 7th On the 14th, magnetic storm
	Mean	29 922	74 3		0 715	84	10	6 5	N 64° E	2 200	
	Min	29 640 (13)	70 5	61 5 (27)	0 484	73 (26)	4	0 6 (1, 19)		3 591	
	Range		8 6	29 5	0 565	21	12				

NOTE.—The figures in parentheses indicate the days on which the observations to which they are appended were made Under the heading "Humidity" the maxima and minima registered are the diurnal mean maxima and minima, in other words, they correspond to the two days of the month whereon the humidity was respectively greatest and least during the 24 hours

I am indebted to the Rev MARC DECHEVRENS, S J, for the above summary of a portion of the observations made at Sicawei

The summer season was cold, wet, and marked by frequently recurring atmospheric disturbances. Only once did the temperature reach a characteristic summer level, namely, on the 18th July, when the mercury touched 94° F.

The following table is drawn up from the English and French municipal burial registers, and from the books of the municipal sexton, which were kindly placed at my disposal —

BURIAL RETURN of FOREIGNERS for the Half-year ended 30th September 1882*

CAUSE OF DEATH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	TOTAL
Small-pox		f 1†† 1	1		1§‡		4
Scarlatina	f 2						2
Enteric fever	1			1			2
Perniciou fever			f 1§‡				1
Cholera					1 1 1§	2 f 1 5	11
Convulsions				1§‡			1
Meningitis		f 1‡					1
Chronic alcoholism	1 1						2
Cerebral effusion				f 1		1	2
Apoplexy					1§		1
Phthisis	1		1§		1§	f 1†	4
Atelectasis pulmonum		f 1††					1
Pneumonia		f 1††					1
Capillary bronchitis			f 1‡				1
Cholera infantum			f 1‡				1
Diarrhoea					1††		1
Gastro enteritis					1‡		1
Suppurative peritonitis		1					1
Disease of liver and kidneys						1	1
Accident (fall from loft)		1					1
Drowned	3	2			1	1	7
TOTAL	9	9	5	3	9	12	47

* Not including deaths among the Catholic religious bodies, exclusive also of Eurasians

† Natives of Macao (5)

‡ Young children (11)

§ Natives of Manila (7)

|| Not resident (21)

A cursory glance at the above table with its appended notes shows that the mortality was extremely low among resident adult foreigners of European birth. Removing 8 deaths due to accident, 39 remain attributable to disease. Of these, 11 occurred among young children, of whom the majority (7) were natives of Macao or Manila. A full analysis of the figures is given in the following tabular statements —

CAUSES of DEATH from DISEASE among RESIDENT EUROPEAN ADULTS, April to September 1882

Small-pox	1	Chronic alcoholism	1
Enteric fever	1	Cerebral effusion	2 (1 female)
Cholera	4 (1 female)	Suppurative peritonitis	1
8 males and 2 females (as against 16 males and 10 females during the corresponding period of last year)			

CAUSES of DEATH from DISEASE among NON-RESIDENT EUROPEAN ADULTS

Scarlatina	2 (females)	Chronic alcoholism	1
Enteric fever	1	Phthisis	1
Cholera	7	Disease of liver and kidneys	1

11 males and 2 females

CAUSES of DEATH from DISEASE among the CHILDREN of EUROPEANS

Gastro enteritis	1	Cholera infantum	1 (female)
Capillary bronchitis	1 (female)	Meningitis	1 (")
1 male and 3 females			

CAUSES of DEATH from DISEASE among NON-EUROPEAN ADULT FOREIGNERS

Apoplexy	1 (Manila)	Phthisis	2 (Manila)
Cholera	1 (")	"	1 female (Macao)
4 males, of whom 2 were non-resident, and 1 female			

CAUSES of DEATH from DISEASE among the CHILDREN of NON-EUROPEAN FOREIGNERS

Convulsions	1 (Manila)	Pneumonia	1 female (Macao)
Small-pox	1 (")	Diarrhoea	1 (Macao)
"	1 female (Macao)	Perniciou fever	1 female (Manila)
Atelectasis pulmonum	1 " (")		
3 males and 4 females			

It should be remarked that at least three of the deaths occurring among non-residents have been placed under that heading on purely technical grounds. In each case the deceased had taken up residence in Shanghai, but was overtaken by the illness which proved fatal, within six months of arrival. From April 1881 until May 1882 no death was reported from small-pox, and of the three which occurred respectively in May, June and August 1882, two (Macao and Manila infants) may probably be attributed to neglect of vaccination. In March 1882 a Portuguese (European) lady died of pneumonia, secondary to scarlet fever, which latter declared itself exactly a week after a natural labour. Six children in the house took scarlet fever, all exhibiting symptoms of more or less severity, but all recovered. The most minute inquiry failed to throw any light on the source of the contagion. While these children were ill, but without any communication that could be traced between the families, two young girls, sisters, were attacked by scarlet fever.

In both it ran a severe course, but convalescence was fully established, when one of the girls was found dead in bed, whither she had returned after some slight exertion in her room. A postmortem held next day by Dr. PICHON and myself revealed old and extensive heart mischief, which, curiously enough, was more pronounced on the right side than on the left. Death was due to sudden failure of the heart's action, the right auricle, ventricle and pulmonary artery being gorged with fluid blood, and both branches of the latter containing in addition a quantity of loose coagulum. The second sister, an excessively delicate girl, died 10 days later of acute miliary tuberculosis.

These appear to have been the only fatal cases, and in each death was due to complications.

Although what follows belongs properly to the Report presently to be published on the succeeding half-year, it may, for reasons that will appear farther on, fitly find a place here.

On the evening of the 18th November one of the Portuguese children above referred to, who in March had recovered from scarlet fever, and who in the meanwhile had been placed as a boarder at the Institution St. Joseph, became feverish, and complained of sore throat. She was a girl aged seven. Called to see her after dark, I could find nothing suspicious about the fauces, but prostration was so intense, altogether out of proportion to the degree of fever (101° F) and to the local condition,

that I advised her immediate isolation. This was effectually done, for it so happened that a number of rooms recently vacated by their occupants, who had moved into newly erected buildings at some distance from the old, were available for any purpose of the kind. Two French sisters were specially detailed to look after the child, and intercourse between them and the rest of the community was strictly interdicted. The necessary cooking and washing were done on the spot by these sisters. Next day there was a slight pellicle on the left tonsil. The constitutional symptoms were extremely severe, and treatment was chiefly directed to sustaining strength, a wash of solution of boracic acid, frequently applied, being the only local application used. On the 20th, soup and wine were freely taken, without, however, any appreciable effect. The membrane was confined to a small area on each tonsil. Spray of lactic acid was applied once, but produced dyspnoea, and was abandoned. The boracic acid wash was, on the contrary, well borne, and appeared to soothe. Late in the evening a violent attack of dyspnoea occurred, and persisted for about half an hour, when I performed tracheotomy, with the result of giving immediate relief. The child, however, speedily sank and died.

Inquiries were immediately set on foot with a view to find the origin of contagion in this case. They were long fruitless, but some weeks afterwards it was discovered that at this time a Chinese woman with a sick child had been lodged in the servants' quarters, which are unusually extensive, attached to the house occupied by the little girl's father. It came out that the native child had had fever and sore throat, with great difficulty in swallowing, and that it had been kept at the house up to a few hours before its death. The little girl had visited her home on the 16th, about 50 hours before she showed symptoms. Why the other children were not attacked is one of those questions which the selective action of contagion continually suggests. One child, an elder sister, did in fact suffer for three or four days from an attack of ordinary sore throat, which, however, led to nothing.

Parenthetically I would remark that unless foreign householders make a practice of frequently inspecting their servants' offices, they have no security whatever against the introduction of the most dangerous forms of communicable disease within their premises. Then male and female servants will take no precautions whatever, and children are as likely as not to be brought into immediate contact with diseases against which parents flatter themselves that they are protected by the care which is lavished upon keeping them far from known sources of contagion. An unexpected visit to one's servants' quarters reveals many astonishing facts. No doubt it is only exceptionally that disease and death are found sheltered under one's own roof. But the incredible dirt in which the most respectable native servants live, the vermin which they cherish in their rooms, and the overcrowding of quarters calculated on no very liberal scale for the number of persons actually employed, are revealed with a clearness startling to anybody who for the first time undertakes such an exploration as I recommend. In this connexion, too, it seems advisable to remind the community that sooner or later the Municipal Council will have to deal with the question of overcrowding in native houses. The overcrowding of the settlements by Chinese, and the rapid disappearance of every patch of open ground are obvious to everybody, and are serious menaces to public health. That native houses should be set as close together as they can be packed is bad enough, and is of itself sufficient to bring many evils in its train, more especially when the abominably filthy habits of the Chinese are considered. But far worse than this is the dense overcrowding of individual houses, coupled with the absence of any provision for the notification of infectious disease or of the

occurrence of death. There is no reason why a dead body should not remain for days or weeks in a house filled to overflowing with people still living, and closely surrounded by other houses equally tightly packed, while there is no lack of evidence that persons stricken by diseases of all kinds, in which according to European ideas isolation is essential, run through the whole course of their maladies in rooms crowded with men, women and children, amongst whom contagion is sown and by whom it is of course spread. It is not easy to see how the Municipal Council can begin to interfere, the difficulties in the way of such action appearing, I confess, insurmountable. It is highly probable, however, that diseases which have hitherto appeared only at rare intervals among foreigners, such as diphtheria and typhus fever, will soon become endemic among the native residents in the settlements, and it is reasonable to suppose that the frequency of their occurrence among foreigners will simultaneously increase.* With small-pox we are already familiar. Its increase is a matter of course.

In December last I was called by a Cantonese girl to see a woman and child supposed to be dying in a native house in Honan Road. The room into which I was introduced was about 11 feet high, 11 feet long and 9 feet wide. It was lighted and ventilated only by the door which led into a narrow passage. In it was a stove which threw out an overpowering heat, a kerosene lamp, a four post bedstead, and a native bed on trestles. In the larger bed was a little boy dying of diphtheria, and a woman engaged in tending him. A second woman slept in the bed at night, as I was informed. The child died about an hour after I left. On the trestle bed was a young woman dying of typhoid fever, and it was evident enough that she had no control over her evacuations. She died during the following night. Her bed was shared by a friend who it was said looked after her, but who did not happen to be present during my visit. When I entered the room an old woman was engaged exercising the two patients, and I was told that her business was to go from house to house when sickness was present, and drive devils away. There appeared to be a constant stream of visitors, at least five women having come into the room during the few minutes of my stay.

There is hardly a circumstance mentioned in this last paragraph which is not pregnant with suggestions of danger to public health. I have no reason to believe that the case which thus came under my notice was exceptional. Indeed, considering all the conditions, it would be impossible that it should be exceptional.

Bearing all this in mind, it is hardly worth while to ask how any given instance of contagious disease occurs in a foreign patient. After the death of the little child at the Institution St. Joseph, the most minute precautions in the way of disinfection were taken. The floor, walls and ceiling of the room she occupied were scoured with a 5 per cent solution of carbolic acid, and were then limewashed, the bed was destroyed, the iron bedstead taken to pieces and scoured with carbolic soap and boiling water. The clothes worn by the attendants were boiled within the building in which the patient had been kept, and the attendants purified and disinfected themselves with the most sedulous care. I believed and still believe that the infection was stamped out.

Thirty-six days (26th December) after the child's death a nun complained of sore throat and dysphagia, which she attributed to cold caught three days before while walking with some of the pupils in the country. As she had suffered from a delicate throat since her early youth, she paid little attention to her symptoms until difficulty in swallowing compelled her to seek advice. When seen, early in the

* There is no hospital accommodation in Shanghai available in such an event.

afternoon, the fauces were deeply injected, the tonsils much swollen, and the uvula œdematous. There was great difficulty, apparently of a paralytic character, in swallowing. A spoonful of milk would go down with a sort of jerk, and after a minute or so would be rejected unchanged and without any straining, the patient having spoken in the interval. The voice was nasal. Examined in a strong light, there was no sign of membrane on the tonsils or in the pharynx. The axillary temperature was 100° F. What was most striking was the intense exhaustion, and this suggesting mischief to come, the patient was isolated, and the same precautions taken which had been before adopted. Next day there was a distinct diphtheritic patch on the left tonsil, and in the afternoon gangrene had invaded that tonsil and the adjacent portion of the soft palate. Deglutition was extremely difficult, yet a considerable amount of wine and concentrated soup was swallowed and retained. Feeding was almost continuous through this day. The pharynx was frequently swabbed with a saturated solution of borax in glycerine diluted with an equal bulk of hot water. Each swab was burned immediately on being used. Steam, through which creosote vapour was diffused, was inhaled as frequently as possible, but it was badly borne, and was difficult of administration in the recumbent position. There was comparatively little interference with breathing or speaking. The condition remained almost unchanged next day (28th), except that, while there was no dyspnoea, the voice was almost extinguished. Gangrene had advanced slowly to the middle of the soft palate, where it seemed to be arrested. The slough on the tonsil was beginning to separate, leaving a bleeding surface, from which small quantities of blood were occasionally coughed up. On the morning of the 29th, the temperature was normal, vomiting had occurred three times, detaching several pieces of slough which had separated without hæmorrhage. Nourishment and wine were taken in increased quantity. Externally the neck was swollen and tender, pain radiating from the tonsillar region to the clavicles. As there was some nausea, the patient was allowed to suck ice, which checked it. About noon, without any apparent change in the general condition, breathing began to be obstructed, but dyspnoea did not become marked until 3 P.M., when I saw her. I immediately returned home to fetch a tracheotomy tube, but during my brief absence she asked to be allowed to change her position. She turned slowly off her couch, took one step to an armchair, and sat down dead.

From first to last there had been no albuminuria*. Sleep was at first obtained in snatches by means of chloral, but as this drug when largely diluted took a very long time to administer, and when not so diluted was painful to the throat, it was replaced by small doses of bromide of potassium with tincture of digitalis, which acted sufficiently well.

This lady had been, during the days immediately preceding Christmas, in constant contact with children passing to and fro between the Providence School (which is isolated from the Institution School for paying pupils) and their homes. In many instances these homes were Chinese houses, and I at first thought it possible that she might thus have picked up the contagion. Later on, however, I discovered a fact which had been unaccountably forgotten at the moment. On the 18th December this nun, with another who was in excellent health and free from any past or actual predisposition to throat trouble, visited a little girl living in Hongkew who was at the time suffering from diphtheria, and who died next day. The nuns were ignorant of the nature of the disease, and both kissed the child on parting from her. The second nun escaped.

The same processes of disinfection were gone through as after the first fatal case. Those boarders in the Providence School who had been allowed to go out were on their return scrubbed in hot baths with carbolic acid soap, while every particle of their clothing was changed before they were allowed to take their places in the school and dormitory.

* In all the cases search was made twice daily, but no trace of albumen was ever found.

In spite, however, of all this, a Eurasian child, who had spent Christmas Day and the day following with her mother in a Chinese house in Hongkew, showed suspicious symptoms on the 30th December. She was immediately isolated, and the same procedure which had been before followed was rigorously adopted. The case proved to be one of average severity as far as the local condition was concerned, but the general condition was never alarming, and recovery was rapid.

Here ended my experience of diphtheria within the walls of the convent, and indeed my entire experience for the year, for I had no cases in private. I am satisfied that each of the three cases arose from a separate source of contagion, and that the escape of the French Convent and girls' schools (containing on an average about 100 persons of all ages) from an epidemic which must have proved disastrous was solely due to the conscientious manner in which, at vast inconvenience and at no inconsiderable expense, the minutest precautions were taken to prevent the spread of the disease. No one who does not know something about the organisation of a vastly overworked religious community can realise the extreme difficulty of detaching a staff, completely isolated from the rest of the society, for the purpose of watching one individual. Moreover, going to work as the necessities of the case demanded, it was found that much furniture, clothing, etc., had to be ruthlessly destroyed or spoiled. I do not know that the fact that this was cheerfully done reflects credit upon anybody, seeing that there was so much at stake, but at all events it was done, and it is thus explained that there was no communication of disease within the convent itself.

This history of diphtheria as observed by me in 1882 is, as I have already said, an anticipation of the Report on the winter season, but the various incidents just narrated link themselves so naturally with one another, and with the details of the cases of scarlet fever from which I started, that there is an obvious reason for placing it where it is.

The case of suppurative peritonitis fatal in May is in many respects interesting, but chiefly on account of the impossibility of assigning any cause for the affection.

J. T., a lightkeeper, about 45 years old, was brought to Shanghai during the night of the 5th-6th May, and was seen at 4 A.M. on the 6th. He had been in good health up to the 1st May, but since that date he had been unable to obtain an action of the bowels, and since the 3rd he had been in violent and continual pain. Beyond this he had no history to give. Several doses of oil and laudanum had been administered, some of which he had vomited. Every now and then he suffered a subjective sensation of intense cold, but without rigor. Hot milk was given as soon as he arrived, but was at once vomited. Surface of body cold and moist, pulse, 128, extremely small, temperature under tongue, 97°. Abdomen tensely distended and very sensitive. The course of the colon could be followed by the eye. Little information was obtainable from percussion, as the slightest stroke was extremely painful. There was no hernia at any of the openings. Urine was passed freely. Nothing could be discovered by the finger in the rectum. The diagnosis was paralysis of the muscular coat of the intestines from peritonitis, the cause of the peritonitis being probably the rupture of an abscess in the neighbourhood of the cæcum. Hot poultices were constantly applied to the abdomen over a plaster of opium, mercury and belladonna. The patient was kept slightly under the influence of morphia administered hypodermically, ice was freely given, and for nourishment frozen milk. One grain of calomel was laid on the tongue every hour for 10 hours. Next day (7th May) there had been two small watery stools, with discharge of a considerable quantity of wind. Vomiting quickly followed the ingestion of any nourishment, but a certain amount was retained, as urine was secreted in large quantity. The abdomen was less sensitive. In the evening there had been no stool, but a few ounces of putrid fluid had drained away. Pulse, 138, thread like,

temperature, $98^{\circ} 6$ As the chief source of suffering appeared to be the distension, an O'Benne's tube was passed for 10 inches into the rectum, without encountering any obstacle, but gave exit to only a very small quantity of fetid gas At night the pulse rate rose to 168

8th May—Morning temperature, 98° , pulse, 130 No stool Urine passed in small quantity, not albuminous Little change in appearance of abdomen, except that the small intestines are now clearly defined through the abdominal wall There is much distress from distension, yet the abdomen is almost indolent to percussion Deeply seated dulness can now be made out, extending from the right groin half way to the umbilicus, and bounded by a horizontal line drawn through the anterior superior spine of the ilium Five capillary punctures were made, but only from one point (a little below and to the left of the umbilicus) did any gas issue Puncture of the distended colon gave exit to nothing Vomiting of yellowish green fluid containing much bile was almost incessant At 5 P.M. the symptoms were unchanged, and death occurred at 6.30, the patient retaining his senses to the last The application of opium, mercury, and belladonna to the abdomen, together with hot poultices, was continued throughout

Extract from Report of Postmortem held 16 Hours after Death—A large quantity of turbid fluid had escaped from the mouth Rigor mortis strongly marked in all the muscles Faint cadaveric odour Eyelids closed, jaws closed, abdomen tense, greatly distended, tympanitic everywhere, anus closed

Abdomen—Incision from tip of xiphoid cartilage to pubes passed through a layer of fat $1\frac{1}{2}$ inch thick Recti muscles, red, firm, and of natural appearance Two oblique incisions following lower costal border from the xiphoid cartilage into the lumbar regions exposed the contents of the abdomen Colon and liver not at first visible, being hidden by the upper 10 feet of the small intestine largely distended and bulging forwards and upwards On lifting this portion the lower 10 or 12 feet of the small intestine was found moderately distended, deeply injected, covered with pus and with flakes of lymph of varying size, some attached, some free in the peritoneal cavity, and measuring 3×1 inches The cæcum was firmly adherent to the abdominal wall and was bathed in pus, but there had been no abscess formation, appendix empty, not perforated With the exception of the upper 10 feet, all the coils of small intestine were matted together by old and recent lymph The colon throughout its whole extent was deeply inflamed, distended and covered more or less completely with pus Its mucous membrane, as well as that of the lower half of the small intestine, was dark slate colour, deeply inflamed but not gangrenous It contained a number of small pellets of faecal matter, none of which filled the calibre of the bowel The small intestine was perfectly empty Its upper 10 feet and also the stomach were healthy, except for their great distension The quantity of fat deposited in the mesentery was very remarkable The parietal peritoneum was almost healthy in appearance down to the level of the umbilicus, below this line it was deeply injected The pelvis was full of pus, which apparently had gravitated into it from the surface of the intestines The liver weighed 60 ounces, and was apparently healthy Gall bladder distended with viscid bile Spleen very small ($3 \times 2 \times \frac{1}{2}$ inches), shrivelled on the surface, and its pulp reduced to an evil swelling putrilage; but there had been no rupture of a splenic abscess Kidneys natural Bladder healthy, containing about 6 fluid ounces of urine

In another part of the report it is noted "No tubercle in the lungs no deposit on any of the valves of the heart or great vessels"

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